Understanding Farmer Decision Systems That Relate To Land Use

Report to the Department of Sustainability and Environment

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Executive Summary

Aims of the Project
The project had two aims. The first was to increase our understanding of farmer decision systems particularly in regard to how farmers saw strategic opportunities. The second aim was to make recommendations, using this improved understanding, about how to modify and promote findings from the Farm Business and Biodiversity Project. (The terms of reference for the project are given in Appendix 1).

Background
This project Understanding Farmer Decision Systems That Relate To Land Use (U-FDS), was conducted between November 2005 and May 2006 and was undertaken at RMIT University, Melbourne. It built on the systems thinking approach and motivation theory developed in the three-year project Drivers of Land Use Change (DLUC), undertaken by the Victorian Departments of Primary Industry and Sustainability and Environment (DPI and DSE).

Method
Fourteen confidential in-depth interviews, involving twenty-one people, were conducted in western Victoria with farmers who ran a sheep enterprise as part of their farm business. The interviews focused on how farmers perceived opportunities to use their resources (eg. their time, knowledge, skills, and financial and physical assets) to create developments that satisfied their family's motivations. The interviewees were asked to talk about the enterprises they ran on their farm, the strategic decisions they faced, whether or not they were expanding their farming businesses and what other activities they were involved in. The issues interviewees raised included technical matters, family issues, contacts with others, responses to drought, marketing changes, education and information, retirement and succession planning, environmental issues, business partnerships, land purchase and leasing and off farm activities and employment. The interviews were recorded and verbatim transcripts were prepared. The transcripts were analysed using the procedure for developing grounded theory.

Project Findings
The project has delivered on its first aim by developing an understanding of how farmers view strategic opportunities using a concept we called Personal Career Path. The report discusses some of the inferences that flow from the Personal Career Path concept and suggests studies to advance and apply the concept.

The project has delivered on its second aim of making recommendations about how to modify and promote findings from the Farm Business and Biodiversity (FBB) Project by making five recommendations based on the Personal Career Path concept. The report also discusses several points to be considered when undertaking projects similar to the FBB Project.

The Personal Career Path Concept
The analysis of the interview transcripts showed that a concept we called Personal Career Path was useful in providing a structure for understanding how the interviewees perceived and created opportunities in farming to satisfy their motivations. Strategic opportunities are those that result in decisions that are maintained for a long period and impact on the satisfaction of motivations.

Personal Career Path represented the unique way in which people chose to satisfy their motivations through farming. Other career paths such as teaching, politics or running business ventures outside the farm are important but not the focus of this project. Personal Career Paths comprise people's aspirations, as well as their plans and actions to make them reality. People may not map out career paths in great detail, rather we assume they have some idea of what they want to do and achieve in life. We could think about a Personal Career Path as a series of rolling tasks, some bringing more success than others, but somehow people follow the general direction of their interests so creating a Personal Career Path. Success on a Personal Career Path is determined by whether or not motivations are satisfied by farming activities when the members of the farming families need them to be satisfied.

Progress along their career paths was achieved through developments that farmers actively created by implementing suitable and available opportunities on the farm. Developments contain tangible parts
such as land and sheep purchases and debt and intangible parts such as improving skill in sheep husbandry and marketing arrangements. Opportunities have both personal and external components. A great deal of the interview material concerned the personal components of opportunities and how the interviewees were improving these. They talked about improving their skills, doing training, buying land, improving stock, soils and pastures and building financial assets. The external components were not discussed much in the interviews but all interviewees were well aware of their importance, especially the price of commodities such as wool and cereals. The focus on the personal components of opportunities seemed to be the principal way the individual farmer thought he or she could incrementally fulfil family obligations and obligations to themselves.

Some interviewees talked explicitly about career paths in farming,

"Yes, I do find it [farming] exciting…. You've got to have an appreciation of animals and the soil and the climate and your general environment in waterways and the geological formation of the country. All of those sorts of things form an ideology in your mind about what it is you want to be involved in. It's from that sort of formation and understanding of those ideas is the reason that I pursue a career in farming."

The opportunities that farmers seek in following their Personal Career Path is greatly influenced by three things - the 'skills' they develop, the 'resources' they have accumulated, and the 'contacts' that they use. Relevant contacts include both those who enhance their personal knowledge and business contacts. Credibility of contacts depends on which of the farmer decision systems they relate to – the family, farm business or land ownership. Farmers may consciously create their own 'communities of practice'. if you want to get somewhere the best way to do it is to surround yourself with the people who are like minded and actually, you know, they may have different set skills, sets of intelligence that you can actually lean on them or source them in a particular thing that you want.

It cannot be taken for granted that conservation advice provided by production orientated contacts would be regarded by farmers as credible. Carolan noted that even within the technical areas of agricultural extension in the USA the credibility of experts varied greatly. He found that "Iowa State Extension personnel, and agricultural professionals in general were perceived by three-fourths of sustainable agriculture proponents [farmers] as lacking the technical knowledge needed to make them viable sources for information pertaining to sustainable agriculture" (Carolan 2005 p 399). The report provides a logical framework for investigating the kinds of contacts farmers might find credible for a range of decisions and so facilitate the task of extension and communication.

Being on one's own career path delivers considerable psychological benefits. However, the interviews suggest that tensions exist between the obligations the individual farmers felt to themselves (their Personal Career Path) and obligations to family, friends and 'society' more generally. Tension is also created by external events such as the weather and changes in laws. The resolution of these tensions seemed to be important in how farmers recognised and took up opportunities.

Possibly the most important and consistent tension in executing a Personal Career Path is the individual's obligation to their family – both in earlier life to one's parents' family and later to farmers' own spouse and children. For example, the Personal Career Path might lead the person to concentrate on growing finer and finer wool, that is their passion, but for the sake of maintaining family income they start a prime-lamb enterprise.

By far the most influential social obligation in agriculture is towards increasing production and quality of products, increasing resource use and creating efficient business arrangement. This direction is pervasive, so pervasive that it is generally taken for granted. The other direction for social obligations to influence farmers is towards conservation and protection of ecosystems. This influence is smaller and much more disjointed. It is often cryptic, difficult to get information on, and viewed as alternative.

The analysis showed that farmers selected the opportunities they took up by looking at options through a series of five Lenses. These Lenses were; Intrinsic interests, Family obligations, Social obligations, Knowledge of their personal abilities and resources, and Knowledge of and access to external resources. Using these Lenses helped the decision-makers in farming families create and maintain developments that they thought would satisfy their own and their family's motivation in the long-term and also help resolve the tensions between family members and to some extent, the tensions between
them and the society in which the family lived. The Lenses provide a picture of the point at which programs and policies influence farmers’ strategic decisions.

The five Lenses are shown diagrammatically in Figure A. The concept of Lenses is discussed in detail in section 2.3 of the report.

Changing the decision at the first Lens can result in more change over the framer’s lifetime than changing the decision at the fourth Lens. This is sometimes called leverage. Lens 5 provides the least leverage. This is because by that time, only a small percentage of the vast array of options is still in contention, the others have been removed by the earlier Lenses. Providing a fencing grant for improving native vegetation retention is an example of overcoming a Lens 5 problem; providing an external component of an opportunity. Lens 1 is the Lens with the most leverage; if all farmers feel that retaining native vegetation is intrinsically interesting and within their Personal Career Path then the second arrow will be as big as the first.

Figure A. The five Lenses used in seeking and identifying an opportunity that is relevant to the farmer

What we are suggesting is that generally people prefer to follow their intrinsic interests and, if possible, pursue a career that relates to that interest in some way. People may have many false starts but tend to come back to a particular set of interests. All sorts of things might influence the passage of a Personal Career Path either towards or away from intrinsic interests. These influences can be grouped into seven areas.

Agencies can change farmers’ strategic decisions by influencing these five Lenses but agencies cannot change these Lenses directly. The crucial step in moving from understanding the farmers’ perspective of strategic decision-making, to understanding how agencies external to the farmer can influence farmers’ decisions, is to take a different perspective of the five Lenses. The perspective is to think of what would change the view through the farmers’ five Lenses. We called this new perspective ‘BOXES of influence’.

The seven BOXES of influence that would change the view through the farmers’ five Lenses were; Early education, Later education, Obligations to parent’s family members, Obligations to own family members, Social obligations, External events and programs, and End of career. These are the seven areas in which changes in agencies’ policies / programs can influences the five Lenses. Agencies can increase the effectiveness of their policies / programs by increasing their understanding of the
relationships between BOXES and Lenses. Generally, programs directed to the early BOXES would tend to have long-term, highly levered but diffuse influences on farmers' strategic decisions, whereas programs directed to later BOXES would tend to have short-term, low levered but specific influences and are more likely to influence farmers' operational rather than their strategic decisions. In some cases, short-term programs might inhibit long-term solutions. These seven BOXES are shown in Figure B. The concept of BOXES of influence is discussed in detail in section 2.4 of the report.

It is useful to visualise the BOXES in terms of how they influence intrinsic and extrinsic motivations. Motivations that are tightly held can be described as 'intrinsic' that is they are generated from within the psyche of the person, this is BOX 1. Other goals can be 'extrinsic' that is adopted from other people or society generally, these can come from influences in BOXES 2 to 6. Extrinsic goals tend to be instrumental and are dropped relatively easily when the external pressure to comply is reduced, whereas people will be less easily put off when they are striving to satisfy an intrinsic motivation. Intrinsic motivations are so important to them they will keep on working at them despite difficulties. If programs of government agencies can tap into intrinsic motivations, they are more likely to succeed in influencing Personal Career Paths.

Short-term solutions that target BOX 6 seem to have priority in government agency action. The long-term solution for issues that are spread widely across society may not be found in mechanisms that influence farmers directly (in BOX 6) but might include the more dispersed influences that exert their effects through programs in all seven BOXES. An alternative approach is for farmers themselves to initiate 'grass roots' programs and so they themselves become the investigator and final authority.

The route for gaining the greatest influence on the Personal Career Paths of people about to enter farming or in their early years of farming is via the contacts that the farmers already recognise as being reliable. Three groups of contacts are important:

- those who advise individuals on their Personal Career Path, [career advisers];
- those who influence the development of farmers' skills, knowledge, confidence etc. i.e. the personal components of opportunities, [educators]; and
- those who control the availability of external components of opportunities [bankers, marketers].

Figure B. Personal Career Path with items that might influence it grouped into seven BOXES.
Inferences that flow from the Personal Career Path Concept

Both the U-FDS project and the earlier DLUC project showed the importance of understanding farming decisions from the perspective of the farming family because the Family Decision System occupied the top spot in the hierarchy of decision systems and so tended to dictate what decisions were made in other decision systems relating to farm business and land ownership. The analysis in U-FDS showed that the tensions in the Family Decision System and how they are resolved are important factors in farm strategic decision making.

If government agencies want to guide progress (such as land uses) without getting negative unforeseen outcomes, there seems to be no alternative but to try and understand strategic decisions from the farmer's perspective. Whether or not a decision is a good or bad one for farmers depends on how well it fits with their Personal Career Path, and satisfies personal and family motivations. Knowing how farmers view and so react to a range of interventions is important not only to ensure the immediate objective is reached but also to ensure that interventions do not lead to unforeseen negative changes.

It is clear that farmers are focused on developments that satisfy their family's motivations and that to support and advance these developments they create and take up opportunities. This contrasts with the tendency of agencies to focus on the economic efficiency and environmental sustainability of the physical parts of these components (NRM issues such as water and land use). The approach taken here offers a way of bringing sustainability issues into the same dialogue as farmers' development issues. Furthermore, knowledge of what farmers are actually endeavouring to achieve over their farming careers would provide agencies with an insight about how they can help farmers make strategic decisions at the most appropriate times in their careers when they still have positive options available.

The concept of the Personal Career Path, as the thread linking the motivation theory and strategic opportunities in our mental model, provides a practical base to understand what farmers are trying to achieve with these dynamic processes. The idea of Lenses helps us envisage where the farmers are accepting influences from, and why they select to be influenced by some things and not by others. Learning provides a way for farmers to clean their Lenses, and the clearer the Lenses are, the greater the range of options the farmer will be able to see. The more options they have, the more likely they will be able to find a course of action that moves them a bit closer to satisfying their motivations. Farmers are engaged in a dynamic learning process, as one interviewee makes clear.

And I think it is probably good to miss a couple of opportunities because it just sharpens you up and you tend to look at the bigger picture rather than the smaller picture.

Studies to advance and apply the concept

The project provided a coherent rigorous framework for understanding the farmer's perspective of opportunities. Its findings provide a platform for further work on farmers' decision systems. Two of the seven suggestions for further projects made in this report on page 46 are given below.

- Improve our understanding of how farmers link their motivations with farm business objectives in order to determine the limits imposed on farming by family motivations. This is important since most farms are family run.
- Investigate the fit between the developments that farmers are creating to satisfy their motivations and long-term improvements in resource use efficiency and sustainability. This is important since these developments will probably not facilitate long-term improvements in efficiency and sustainability of resource use.

Recommendations for promoting the findings of the Farm Business and Biodiversity Project

The concept of the Personal Career Path and the seven BOXES of influence were used to devise five general recommendations on how the findings from the Farm Business and Biodiversity Project (FBB) could be effectively promoted.

The promotion strategy actually being used in the FBB Project is in accord with the first two recommendations and emphasises both production and conservation advantages of the project's findings. The other recommendations are beyond the scope to the FBB Project but they have been included for completeness and to demonstrate one way in which the BOXES could be used.
In general, the interventions most likely to be taken up by farmers voluntarily and perhaps enthusiastically, are those that farmers see as advancing their *Personal Career Paths* within the context of their families. Farmers would tend to take up more NRM options if they could see them contributing positively to opportunities that meet their obligations to their family rather than as impositions that might hinder their progress in satisfying their motivations.

Education early in the *Personal Career Paths* of farmers is likely to have more profound effects on how farming is carried out in the long-term than regulations and incentives. This is because education and improved understanding, while not changing the trajectory of the *Personal Career Path*, may alter the ideas that individuals have about how they can progress their *Personal Career Paths* and satisfy their families' motivations. The long-term influence of education on *Personal Career Paths* suggests that even projects dealing with technical aspects of farm management could be given a greater influence in creating long-term change if the principles on which they are based are included in education programs.

**Points to be considered when undertaking projects similar to the FBB Project**

In addition to promoting the findings of projects such as the FBB Project, the concepts developed in this report show the relevance of farmers' decision systems to similar research projects. Several points for consideration when undertaking projects similar to the FBB Project were developed from the *Personal Career Path* concept. These are points for discussion and further study rather than conclusive findings of the project. They are regarded as tentative generalisations because of the small number of farmers interviewed, and because the project did not set out to reach such conclusive findings.

1. Projects like the FBB Project that create new opportunities to change technical management of farms have limited prospects of success if they do not relate well to the *Personal Career Paths* of farmers.
2. Having a significant influence on farmers' *Personal Career Paths* is beyond the scope of projects like the FFB Project because the trajectories of *Personal Career Paths* are largely determined early in the farmer’s life – during education and early career.
3. It is unrealistic to expect that single projects like FFB will achieve dramatic changes because they provide new information as an additional component for certain kinds of opportunities within existing farming systems.
4. Projects like FFB that emphasise strategies that incorporate farm business success at the same time as environmental gain are likely to interest a range of farmers because they relate to *Personal Career Paths* in more than one way. They would be of interest to farmers wanting business success and to farmers with an interest in conservation and environmental issues.
5. Credible contacts are important, but as farmers seem to compartmentalise decisions by whether they relate primarily to family, farm business or land ownership, it should not be taken for granted that conservation messages delivered by production-orientated contacts will be well-accepted.
6. Even short-term projects like the FFB Project can include educational material on NRM (BOX 1) without compromising their overall purpose.
7. The concept of *Personal Career Paths* relevant for all farmers even if they enter wool-growing late in life or only participate for a few years in wool-growing because the concept recognises that individuals can have *Personal Career Paths* in other industries and can run careers in different areas simultaneously. The concepts of motivations, decision systems, personal and external components of opportunities etc still apply and provide a way of understanding the influences on farmers, whatever their age.
8. Projects like the FBB can increase the effectiveness of their communication strategies by thoroughly investigation the match between the kind of information they are developing and the information distribution channels they intend to use to ensure that credibility in the eyes of the intended recipients is maintained.
9. Ultimately whether farmers take up the recommendations from projects like FBB will depend on whether farmers see these recommendations as allowing them to create opportunities that are suitable for them in regard to their family motivations and available to them by completing the necessary personal and external components of opportunities.
Understanding Farmer Decision Systems That Relate To Land Use

1 Understanding Farmer Decision Systems That Relate To Land Use

The project had the following aims.

- To produce a report about farmer decision systems, focusing on opportunities, with useful recommendations about how to modify and promote findings from the Farm Business & Biodiversity Project
- To advance knowledge about farmer decision systems, extending the work conducted for the Drivers of Land Use Change Project (The complete terms of reference for the project are given in Appendix 1)

Section 1 of this report sets out the work done on how farmers view strategic opportunities in order to advance our knowledge about farmers decision systems. Section 2 of this report sets out recommendations about how to modify and promote the findings from the Farm Business & Biodiversity (FFB) Project.

1.1 Introduction

Production, this year's harvest, is the principal purpose of farming. It is farmers' key contribution to society and what they get paid for. Farmers generally use their farmland productively applying the technologies that are currently accepted as being appropriate for production. Farming technologies are constantly changing and at any one time there is a range in the mix of technologies being used. The same is true of their business systems; the accepted arrangements are changing and at any one time there is a considerable range in the mix of business arrangements that farmers have in place. Farmers, as business people, closely watch and develop their production technologies and business arrangements because without adequate success in these two areas they would be forced out of agriculture.

Farmers have limited time and resources and with production and business on the front burner other less urgent issues have to go to the back burner. This leads to some neglect in the long-term protection of natural assets, referred to here as Natural Resource Management (NRM), such as soils, water quality and native biodiversity, because their maintenance is not critical for business survival in the short-term. A further explanation is that the benefits from conserving natural assets do not all flow to the farmer; some benefits flow to the general public including future generations. This is sometimes referred to as public good conservation. The recent Senate Inquiry into public good conservation noted that it was not occurring to the extent required (P CoA 2001). This is despite the many policies and programs already in place aimed at encouraging public good conservation. The trend in agriculture towards intensification may be exacerbating the problems. Stoate et al. (2001) outlines the impact of arable intensification in Europe on public goods, which parallels or may be in advance of the impacts on public good conservation in Australia.

To maintain the flow of these benefits to farmers and to the public in the long-term, all aspects of NRM ought to be improved including the maintenance of native biodiversity. More effort is required to enable farmers and other landholders to learn about these issues, to learn what remedial action would be best for their own properties, and to take action, making public good conservation a permanent feature of their land management programs. This may require increasing cooperation between government agencies and farmers, as farmers make the land management decisions and government agencies provide the landscape-wide knowledge and the focused information farmers require to make their NRM decisions effective. An important step forward for government agencies in cooperation and working together with farmers on NRM is to improve knowledge about farmers' decision systems, particularly long-term decisions; the decisions that once made are actively kept for life. Farmers understand the need for long-term decisions in NRM, for example, Jenkins (1998) found that over half of the farmers she surveyed were happy to agree to a thirty year contract for the protection of native bush on their properties. A good understanding of farmers' decision systems is essential for government agencies to work effectively and efficiently with farmers on programs aimed at developing the farming sector in the long-term. This project adds a small but important piece to this understanding.
Information and understanding about farmers' decision systems was generated in a project called the *Drivers of Land Use Change* (DLUC) which ran from 2002 to 2005. The project was funded and conducted by the Victorian Departments of Primary Industry and Sustainability and Environment, (DSE & DPI). The DLUC Project reached several conclusions that seem significant for a new formula in working together in NRM.

While the DLUC Project developed an understanding of motivations, it did not develop a clear understanding of how farmers saw opportunities. Therefore, a new project was initiated to investigate how farmers see opportunities and incorporate this view into their decisions. The project is called *Understanding Farmer Decision Systems That Relate To Land Use* (U-FDS) and this report describes this project and sets out its findings. The project was undertaken at RMIT University, and one researcher (Farmar-Bowers) was on the original staff that undertook the DLUC Project.

An outline of relevant ideas from the DLUC Project is given in the next section as a background for this project. In addition, further details from the findings of the DLUC Project are included at appropriate points in the body of the report.

**Attribution of farmer quotations**

This report used a number of quotations from the interviewees. As the interviews were confidential the interviewees will not be identified. However, to satisfy curiosity, a general attribution has been made for the longer quotes. Short quotes are not attributed to any interviewee. For these longer quotes we give sex of the interviewee (M / F) and identify their stage in life as being Starting their career in farming (S) in the Middle of their career (M) or Advanced in their career (A). Hopefully this information will allow the reader to apply his or her own additional interpretation to the quotes and not use it for stereotyping.

**1.2 Background**

This project builds on four groups of ideas that emerged in the DLUC Project and literature that relates to these ideas. First, is the mental model that was developed to describe the process of making decisions. Second, is the systems-thinking approach that was used to set out the hierarchical arrangements of decisions systems that farmers use in regard to land use decisions. Third, is the motivation theory of five hierarchical stories that was developed from a series of farmer interviews. Fourth is an outline of the strategic opportunity theory that grouped the components of strategic opportunities into personal components that the farmer already had and external components that they could access.

**The Mental Model**

The DLUC Project found that farmers' actions on land use could be understood in terms of a mental model that described the interaction between their motivations and how they viewed opportunities.

A mental model of *farmers' long-term decision making* was outlined in the DLUC Project (Farmar-Bowers, 2003). The mental model holds that people take action when their motivations are matched by suitable and available strategic opportunities and uses the short hand of: Motivation + Strategic Opportunity = Action. The model is about the things that influence farmers' decisions to act; so the motivations are the farming family's motivations and strategic opportunities refer to how the decision-makers in the farming family understand or see opportunities (regardless of what might actually exist). The model indicates that actions are the result of the relationship between motivations and strategic opportunities, so both need to be present for farmers to take action. Without motivation people do not act and without an opportunity people cannot act. However motivations are the stronger of the two in the sense that people are driven by their motivations to seek out, build up and generally create strategic opportunities, then take action on them.

The mental model is dynamic, describing the process of taking action, getting results, evaluating results against their motivations and trying again. The process not only involves searching for better opportunities but also clarifying and interpreting their motivations to get a workable result that the family is happy with. Sometimes farmers have to try things out before they can decide for sure whether or not they want further involvement - whether or not it suits their motivations. The extent to which
the person thinks that the consequences of that action advance the satisfaction of a motivation determines the success of an action. The process in this mental model is not dissimilar to the process Pannell et al. (2006 in press) assume. However, the content of the mental model is motivations and strategic opportunities rather than goals / objectives and adoption of innovations which Pannell et al. (in press) address. Thus the work of Pannell et al. (in press), sits within the mental model approach rather than being an alternative. This will be discussed again in terms of motivations, as the mental model makes a clear hierarchical distinction between motivations and objectives. In terms of the mental model, specific objectives are a tool to help the farmer satisfy motivations and their ultimate value depends on whether or not they do help the individual satisfy their motivations.

Systems-thinking

The DLUC Project showed that farmers' decisions on land use could be understood within a systems-thinking approach (described in Flood 1991 and Senge 1990) as the interviews showed that farmers divide their labour and time between different kinds of decisions and justified them using different principles. The project used the self-referential systems-thinking approach developed by Bates (1997) to classify 'like groups' of decisions into a hierarchy of decision systems.

The decision systems of primary interest in the DLUC Project were those that individual farmers used in making decisions about land use. Three systems were identified and form a hierarchy. At the top was the family decision system. This decision system included decisions about what the family would do for a living, whether they would stay farming or leave, how they would allocate their time and resources, how they would use the resources on the farm (including farmland), what they would do for family members, who would inherit the farm, what holidays they would take, whether they would improve the aesthetics of the farm, and so on. These decisions tended to be justified in terms of caring and doing what is right for family members (rights and care ethics).

The other two systems supported the family decision system by making some of its decisions become reality. These two systems were the farm trading business decision system and the land ownership decision system.

The decisions on how to operate the farm from season to season fell into the farm trading business decision system. It was normal for farmers to set objectives for the business. Nearly always technical as well as financial questions were dealt with in this decision system. Decisions that fell within the boundaries of this decision system included those about farming practice, operational procedures, stocking rates, pasture improvements, cropping decisions, fertiliser rates, tree planting, and numerous other decisions contributing to the financial performance of the farm. Decisions in this system are justified on business principles and ethics (Velasquez 1998).

Decisions on land ownership (or leases) fall into the land ownership decision system. Some farmers took many decisions on land ownership during their farming careers while others took very few. While they were based on business principles the strategic nature of these decisions meant that they often carried significant emotional energy as well.

The boundaries for these systems are thus based on both a division of labour and also on the ethical principles used by farmers to justify their decisions. Benson (2005, p88), in his story about a farming family, captures this difference between business ethics and care ethic when he refers to a "perplexing fact of the modern world: that the logic and geography of business is not syncopated with the logic of human feelings".

The systems-thinking approach allows the development of a hierarchy of systems that allows us to deal more effectively with this non-syncopation. Kilpatrick et al. (1999 p 8) in a review of literature noted that "Most farms in Australia are family owned and run, and the challenge is for them to combine both business and social goals". If we interpret "social" as the goals of the family as distinct from the goals of the business then the challenge for the farming family is to understand the difference between these goals and not combine them as Kilpatrick et al. suggest. This is because the purpose of the business is to support the family in a number of ways but especially through income. This relationship would be lost if the goals are combined. Kilpatrick et al. (1999) also noted in their literature review that the 1997 review of the Rural Adjustment Scheme published by the Department of Primary Industries and Energy suggested that "there is a need for farmers to focus more on business goals" (p 8). The systems-
thinking approach used in this project facilitates the separation of these goals and the appreciation of the hierarchical relationship that exists between them. Both kinds of goals (family and business goals) are important and have to be met, but there is a relationship between them that also has to be honoured to ensure long-term success. This is a very important issue that will be discussed later in this report.

The systems-thinking hierarchy allowed us to avoid assuming that all farming family decisions come out of a single highly complex decision process involving many different factors. Instead, we can apply the model to different decisions systems independently and then take into account the hierarchy between decision systems. Each decision system has distinct considerations so there are fewer imponderables and we can ask specific questions about what farmers consider in each case. This not only provides an insight into complex arrangements but also breaks down complexity into convenient units that facilitate analysis (Gao et al. 2003). Thus for example, the considerations in growing a crop are different from the considerations used in buying land. By doing this we can use the model much more precisely and with greater confidence that this equates with the ways in which farmers actually take decisions. This contrasts with other studies. For example, a study of decision making on farms in Scotland, referred to as “the Edinburgh Study”, required a group of experts with knowledge of individual differences, rural resource management, business management, and mathematical/statistical modelling to deal with the myriad of factors involved (Willock et al. 1999).

Motivations
The DLUC Project found that family matters substantially influence long-term decisions about farming and land-use and that family matters can be understood in terms of a hierarchy of motivations. The motivations described in the project were based on a series of in-depth interviews with farmers.

A theory of motivations was developed as part of the DLUC Project. To create information about people’s motivations we asked questions about their fundamental human needs (Max-Neef 1991). The questions asked how the family as a whole was getting their needs met in terms of subsistence, protection, affection, understanding, participation, leisure, creation, identity, and freedom. From these conversations a set of five stories was developed. These stories form a hierarchy of motivations and are set out in Figure 1.

Figure 1. The hierarchical arrangement of the five stories on motivations

<table>
<thead>
<tr>
<th>Succession of family responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enjoying farming</td>
</tr>
<tr>
<td>Overcoming isolation</td>
</tr>
<tr>
<td>Learning about farming</td>
</tr>
<tr>
<td>Educating children</td>
</tr>
</tbody>
</table>

Motivations represent the items or feelings that people try to achieve, or want to have on an ongoing basis, during their lives. They represent the 'ends in life' not a 'means to an end'. In other words, there is nothing deeper that people are seeking. This can be contrasted with objectives. For example 'earn $100,000 this year' is described as an objective because it is a means to an end. The end might be 'educating children'; parents need the money to pay school fees or coaching fees to support a child's desire to become an Olympic champion. The five stories have different priorities over a single lifetime so that educating children might be seen as a passing phase.

While many of the objectives or goals farmers have are maintained for years or decades, it is important for this project to recognise goals or objectives as being a means to an end whereas motivations are ends in themselves. There is a considerable literature on farmer objectives. For example Pannell et al. (in press) identified four goals:

- Material wealth and financial security;
- Environmental protection and enhancement (beyond that related to personal financial gain);
- Social approval and acceptance; and
- Personal integrity and high ethical standards.
They further noted that "Many more specific objectives can be identified, although they generally relate to one or more of the four broad goals outlined" (Pannell et al. in press pp 4-5). Each of their four broad goals is about the means that farming families might use to obtain satisfaction for their motivations. Satisfaction of motivations represents the point when all means, including the objectives or goals about them, no longer influence decisions. Motivation satisfaction is the point where farming families no longer need these goals. These four goals identified by Pannell et al., relate to the mental model developed in the U-FDS project in the following ways.

- Goals 1 and 2 material wealth and environmental protection are goals on the way to achieving satisfaction of motivations and can be thought of as the tangible outcomes of Personal Career Path. This is shown in Figure 2 on page 17.

- Goals 3 and 4 Social approval and personal integrity are part of the personal components that farmers contribute to the creation of opportunities (also shown in Figure 2). They are goals on the way to satisfying motivations in the sense that having approval and integrity are useful attributes to develop in order to advance one's career and satisfy one's motivations.

Makeham and Malcolm (1993) also discussed goals. They listed fifteen goals common to the farming community. Mostly the goals are instrumental, a means to an end, although two, to have a satisfying rural way of life and to have children well educated, are close to the five motivation stories developed in the DLUC Project. The difference between the goals identified by Pannell et al. (in press) and Makeham and Malcolm (1993) and the motivations identified in the DLUC is one of hierarchical relationships; the goals are means to an end, and the end is the satisfaction of motivations. Hierarchical relationships are very important in the mental model uses in this project. For example, there is a hierarchy within the five motivation stories, in the three decision systems and also in the relationship between objectives / goals and motivations. Motivations are at the top of the hierarchy and people create goals and objectives as stepping stones, or tools, towards satisfying their motivations. It is important to remember that in hierarchies, failure of items in the lower rungs of the hierarchy will lead to failure higher up, that is, achieving the top level depends on good performance lower down (Wilber 2000). The interviewees certainly knew this. For instance one interviewee noted:

I've got to make enough [money] to stay in business, but I want to do something for the long term (Attribution FM).

All farmers may well have the objective of gaining "Material wealth and financial security" but the degree to which they hold this objective will be governed by the Motivations they are trying to satisfy. Motivations guide farmers’ actions but they also limit actions; they help farmers know when enough is enough, so they have an evaluation role too.

The hierarchy of motivations provides the standard against which the farming family evaluates the performance of the systems that the farming family develops and uses. For example, the farming family might be operating a profitable farm business from an objective point of view but become dissatisfied because they are not enjoying the work and so decide to sell up and take on some new challenge.

**Strategic opportunities**

The DLUC Project identified five features of opportunities.

1) People were driven by their motivations to do things, but the specific things they did depended on the opportunities they saw. So the important point for researchers is that opportunities have to be viewed from the perspective of the farming family and that each family is likely to have a unique perspective of opportunities, at least in some regard.

2) When farmers took action (like growing a crop or running sheep) they were combining motivation and opportunity. Opportunities comprised two distinct groups of components. One group comprised the things farmers already had- we call these personal components; skills, enthusiasm, confidence, knowledge, land, machinery, stock and time. The other group of components comprised things they got from other people, organisations and agencies- we call these external components: finance, markets, market information, transport systems, technical advice, stock and products, communications and labour.

3) When farmers took action, they were actually creating the opportunity out of components and thus created a unique activity. Farmers were able to improve their actions in two ways. First by
improving the quality of their personal components such as, increasing their skill and knowledge, and increasing the resources they contributed, and second, by improving their access to and the quality of external component such as, cheaper finance, better advice, better markets and so on.

4) Farmers evaluated and reviewed opportunities in terms of two features; suitability and availability. In terms of suitability they might ask; will the results and long term consequences of the action create a development that will satisfy our motivations? If an enterprise started to yield unsuitable results they would look to create something more suitable, something more likely to satisfy their motivations. They also evaluated and reviewed opportunities in terms of availability. Sometimes an enterprise might be very suitable in that it appears to have the capability of satisfying their motivations but the farmer is not able to bring together the components necessary to undertake the enterprise. They may not have the money to buy resources or the credit rating to borrow or don’t have the skills or the time to work the enterprise or they might lack the confidence necessary.

5) Most actions the farmers take are significant in operational terms such as, plant a crop or not (depending on the weather) or sell sheep / wool this month or next month. However, some actions were strategic in that they were actively maintained and had an impact on the satisfaction of motives.

The mental model, the systems-thinking approach, the motivation theory and the outline of the strategic opportunity theory that were developed in the DLUC project provide the starting point for this project.

1.3 Method

Qualitative method
A vital part of understanding farmers' decision systems is being able to explain how farmers view and create strategic opportunities that govern their farming operations including the use they make of land and natural resources. The purpose of the work was to develop this explanation from material gathered from farmers. This requires an overall inductive approach that can build an explanation or theory from the evidence gathered in interviews. Creswell (1998) in reviewing five traditions in qualitative research (biography, phenomenology, grounded theory, ethnography and case study) noted that only grounded theory leads to the creation of a theory that relates to a particular situation.
"The major difference between this methodology [grounded theory] and other approaches to qualitative research is its emphasis upon theory development. Researchers can aim at various levels of theory when using grounded theory procedures" (Strauss and Corbin 1998a p 160). Therefore the qualitative approach used in this project was to gather the information from in-depth interviews and use the process of grounded theory (Strauss and Corbin 1998b) to analyse the transcripts and develop an explanation/theory about how farmers viewed strategic opportunities.

Selection of Interviewees
The project follows on from the DLUC Project, which relied on interviews from dryland farmers in North-eastern Victoria. However, one of the terms of reference for this project was that it should provide useful recommendations about how to modify and promote findings from the FBB Project. The findings of the FBB Project related to woolgrowers’ use of their farms, especially their hill country, and some of the farms used in the project were located in Western Victoria near Ararat. In order to build on the earlier work the project sponsors asked that we interview farmers with wool enterprises who farmed in Western Victoria. Consequently, the criteria for selecting farmers for interview were, that they had sheep (wool) enterprises, lived in the Western district (mainly near Ararat) and were willing to talk freely about themselves and their farming activities.

Fourteen interviews were conducted and took on average of two hours. Six interviews involved partners, usually including husbands and wives, and the other eight were with the sole or principal decision-maker. The interviews were recorded and transcribed by a commercial transcription service. This yielded about 500 pages of transcription. The number of interviews was governed by the budget for the program.

Ethical Considerations
The project received ethical approval from the human ethics committee at RMIT University (approval register number HREC A 742 - 08 / 05). This among other things guaranteed confidentiality. The plain English statement approved by the ethics committee to explain the project to potential interviewees is given in Appendix 3.

Because of the Privacy Act, the researchers were only able to contact farmers through an intermediary who already knew the farmers. The intermediaries approached the farmers first to ask if they would be willing to participate. If they agreed then the intermediary or the farmer themselves (using a return postal form) passed on their contact details to the researchers and interviews were arranged. All the interviews were conducted by Farmar-Bowers.

Interview Question Guide
A question guide was prepared for the interviews and the RMIT University ethics committee approved the content of the guide. The guide is set out in Appendix 2. In summary, the questions asked farmers to talk about their current enterprises, what enterprises they used to have on their farms and enterprises they were contemplating introducing in the future.

Mostly the farmers launched into the topics without hesitation and most of the questions asked by Farmar-Bowers during the interviews were to clarify what the farmers had said. An important aspect of these conversations was to let the farmers talk about the issues that concerned them most as this provided information on what issues were influencing them most.

Recording
The interviews were recorded using two machines. The backup machine used mini-discs and was started first and switched off last. The digital recording from the principal recording machine was transferred to CD-ROM and transcribed by a commercial transcription company.

Analysis
The transcripts of the interviews were analysed by Farmar-Bowers using the procedure for creating grounded theory. The procedure in grounded theory is comparative analysis, comparing the responses of one interviewee with others and also at a later stage comparing these with situations outside the immediate investigation to gain a wider perspective of the findings (Strauss and Corbin 1998b).
The analysis started with open coding in which concepts were identified. Axial coding brought concepts together and helped to fill out the description of the concepts in terms of their parameters and the dimensions of the parameters. Selective coding identified the important concepts that seemed to give a good explanation of what was going on in regard to the farmers' decision systems. Theoretical coding allowed the developing theory to be compared to other situations to improve the researchers understanding of the significance of the theory or explanation being developed.

This was a small study and, instead of writing memos and stories to develop the coding, the analysis was done using diagrams as this provided a visually easy way of identifying the relationships between concepts. About 20 to 30 diagrams were developed for each transcript. A concept was placed in the centre of each diagram and a mind map (Buzan and Buzan 1993) relying on information in the transcript as developed around this concept.
2 Results from the project

2.1 Strategic opportunities

A good way to advance our knowledge of farmers' decision systems would be to develop a concept from the farmer interviews that would help us understand how farmers recognise and create strategic opportunities that further their motivations. The analysis found such a concept and we referred to it as a Personal Career Path. But before discussing this Personal Career Path concept we need to see how personal items, such as a Personal Career Path fits into the idea of strategic opportunities that was outlined in the Drivers of Land Use Change (DLUC) project.

Where are strategic opportunities?

A good starting point is to appreciate that opportunities have a large number of components. A single opportunity may have dozens of component parts. In addition, these components exist in different places. From the farmer's perspective the components of opportunities exist in two places. One place is on the farm and in their heads, in other words, what the farmer can contribute immediately to create an opportunity for himself/herself. These we call personal components of opportunities. The other place is off the farm, in other words, what the farmers can get from external people and organisations. We call these external components of opportunities.

What one farmer sees as an opportunity to act on, such as the change in a commodity price, the next farmer might note, but not see it as an opportunity. This may be because the price change does not seem relevant to what they are doing or they don't have the necessary resources or skills to capitalise on the information. As a consequence he or she takes no action. The external components of opportunities exist in the world outside the farmer's direct control. The personal components of opportunities include the resources they control (land, machinery, time, money in the bank, etc) and what they think; their skills, knowledge, aggressiveness, energy, confidence etc.

The existence of these two groups of components is born out in the interviews, which also suggest that the interviewees thought the personal components were more important in governing what they did than the external components of the opportunities. Although hearsay, farmers recognise this when they refer to a neighbour as a 'real entrepreneur'. Essentially these 'entrepreneurial farmers' are seeing new opportunities and they are taking them up when other farmers are not. One 'entrepreneurial farmer' noted that,

"People call me a bit of an innovator and I tell them I'm not doing anything that hasn't been done before for at least 10 years. I'm just putting it all together" (Attribution MM).

He is putting existing components together to create a new opportunity for himself. That farmers appreciate that personal components, including skill development, is a necessary part of opportunities (for the business) is partly born out by comments made in a 1999 RIRDC study: "Many of those interviewed commented that learning (and training) was an investment in the farm business. Only a small number saw it as a cost" (Kilpatrick et al. 1999 pp 73-72).

A great deal of the interview material concerned the personal components of opportunities and how the interviewees were improving these. They talked about improving their skills, going on training programs, and also talked about increasing their physical resources, such as buying more land, improving their stock, soils and pastures and creating a war chest (of money). The external components were not discussed much in the interviews but all interviewees were well aware of their importance, especially the price of commodities such as wool and cereals. All but two of the interviewees were well into their farming careers. Some were vigorously building their careers and businesses while others were starting to consolidate and thinking about passing on the reins. Passing on the reins, in some cases, was going to involve a new invigoration phase to enlarge the farm business so that it would be able support the next generation of families as well as the retiring farming family.

It seemed that the farmers' focus on the personal components of opportunities was there because it was the principal way the individual farmer thought he or she could incrementally fulfill family obligations and obligations to themselves. Improving the personal components of opportunities was the main means towards being successful - that is satisfying their family's motivations.
We can imagine that a person's internal desires and intrinsic interests lead that person to want a career path that fulfils those desires and interests. However, real life experiences buffet and batter this, so that, as life goes on, decisions on what to do next are based on a mix of that fundamental career direction and 'reality'. This created some of the tensions noted in the interview between 'what I wanted to do' and 'what I can do', as well as 'what happened'.

**Personal Career Path** is a useful concept to discuss the personal components of opportunities and how farmers relate to the external components of opportunities. It also relates the taking up of opportunities with the farmer's obligations to his or her family. We will use the **Personal Career Path** concept to draw together and describe the findings of these interviews.

### 2.2 Personal Career Paths

This project supported the findings of the earlier work on motivations. It supported the concept of strategic opportunity, which suggested that farmers actively look for opportunities that are suitable, (likely to satisfy their motivations) and available, (farmers are able to access all the components necessary to take action). This also supports work by Brodt et al. (2005) which showed that farmers were not passive recipients of information. The project also supported the idea that the components for strategic opportunities consist of some personal items such as skill and the farmland they owned, and some external items such as markets and borrowed finance.

The key concept developed in this study was dubbed the **Personal Career Path**. **Personal** refers to an individual conscious being, as opposed to a family unit. **Career** is taken to mean a path through life and **Path** was taken to mean a course of conduct.

The phrase **Personal Career Path** is used in this report as a concept or idea to put a boundary around what farmers said about their own path through life; where they were coming from and going to and what influenced their passage. As a concept, it does not give any information about the content of an individual path through life, but it is clear that each person has one and that it is a process.

This project only concerns the part of people's lives that related to farming. A person may have several career paths running concurrently or sequentially. For example, an individual may be a public servant, doctor, accountant, office worker, teacher or musician but also run a farm. The project is only concerned with understanding their farming based **Personal Career Path**, which includes understanding what considerations influence the decisions they make in farming. So the **Personal Career Path** in this report is the one that concerns farming.

The concept of **Personal Career Path** provides the explanation of how farmers actively and progressively use the tangible actions of farming to satisfy their motivations (the five stories of the farming family motivations developed in earlier work). It provides a framework to help understand what individuals are seeking to achieve when they create and use strategic opportunities. This is shown diagrammatically in Figure 2.

There are three caveats to Figure 2.

- The figure shows **SATISFACTION** as occurring at **RETIREMENT** but in reality, the middle part of the figure reiterates many times during a working life so satisfaction of motivations comes at many times if not all the way through a career path.

- The figure shows no alternative to **SATISFACTION**, but very often **SATISFACTION** does not occur and the person remains disappointed. At some point in time, people have to accept that their achievements and failures are final.

- The figure shows the **TANGIBLE OUTCOMES** of individuals’ journeys from motivations to satisfaction of motivations in a separate box to the side. While this is so overall, individual farmers can build tangible assets like businesses but also dissolve them. **TANGIBLE OUTCOMES** are a means to an end. They are the assets and products that people use in their endeavours to satisfy their motivations. So **TANGIBLE OUTCOMES** wax and wain and change in nature and quality over a working life, but eventually they are taken over by other people. This changeover is the idea that the figure is depicting.
In this project we are focusing on how farmers identify and create strategic opportunities. Strategic opportunities are those that result in decisions that are maintained for a long period and impact on the satisfaction of motivations. Many natural resource management (NRM) decisions, such as conserving soil, native biodiversity or land rehabilitation, are strategic as these projects have to be maintained in the long-term.

We are interested in understanding how farmers see, recognise and get inspired to create and take up strategic opportunities because this knowledge can be used to present natural resource management programs in such a way that farmers see NRM programs as strategic opportunities. By seeing NRM as opportunities rather than as impositions, farmers will tend to take up more NRM options and so change their practices to achieve more sustainable outcomes.

This work does not assume that government agencies have full understanding of NRM and are trying benignly to help farmers. Rather the assumption is that many of the specialists in the public sector, such as scientists and engineers, can provide insights into how to improve NRM but that farmers need to know about these insights because the task of implementing relevant improvements is principally in the hands of farmers. Some sort of cooperation between farmers and agencies would seem useful.

An important base for increasing cooperation is to improve the understanding of the decision processes that farmers use when considering different kinds of opportunities (for instance strategic versus day to day or operational decisions). A farmer will take a different approach when making decisions about different kinds of opportunities, so some will be fairly automatic, others will be researched in detail while others will be emotionally charged and very difficult to take. Selling the wool is not the same as selling the farm, which is why one interviewee commented,

*Yeah, it’s hard. That’s why I tossed and turned for two months whether to sell that farm over there. I said, oh it’s my left arm* (Attribution MA).
Understanding Farmer Decision Systems That Relate To Land Use

However, the kind of decision one farmer finds difficult, a neighbour might find easy. This led one interviewee to remark,

My experience is that people who sell [their farm] once, there’s usually a huge break to sell once, will sell time and time and time again (Attribution MA).

The differences may seem subtle yet getting the subtleties right is likely to make a big difference in what NRM actions farmers take up.

A Personal Career Path has a start and end point. The end point is easier to conceptualise in terms of the farming venture. It is not necessarily death but rather when the individual accepts that he or she has achieved what they can with the farm and their agricultural pursuits, and decides to move on into other fields. That might be when farming activities stop and the farmers take jobs elsewhere, as in a structural adjustment, or when the farmer retires. Retirement was a frequently mentioned topic; the interviewees saw an end to their careers in farming with 'before 70' being a favoured departure age. For example, one interviewee said,

We are expecting to be able to retire from farming and still have a young enough age to still enjoy some retirement, sort of thing, which I guess a lot of farmers don’t do. They stay on the land one way or another (Attribution MM).

The start point of a Personal Career Path is harder to conceptualise. Mostly, the interest in having a particular kind of farming career starts early in life. The farmer interviews conducted for DLUC suggested that life-long interests may be stimulated in pre-school years (Farmar-Bowers 2004). Specific interests can develop during schooling and training such as farm apprenticeships or university degrees. Most interviewees’ parents were farmers and the decision to go farming might have been made easier knowing that they would be able to start their farming careers with an inherited operating business. However questions of buying out siblings and expanding the farm usually had to be addressed. Others had a less conventional start. For instance, one interviewee noted that,

when I was 21…. that's when I thought yeah there is a career to be made in agriculture (Attribution MM).

A Personal Career Path could be envisaged in many different ways. We are taking it principally to mean how people make their living from farming, and appreciate this can impact on many other aspects of their lives. Our prime focus is on how agriculture features as a Personal Career Path. We understand that people have a whole host of aspirations in their lives and may have several careers as a result, but this study is interested in describing how they are using, and intend to use, farming to satisfy their motivations. A Personal Career Path is an ongoing process that ends only when the farmer retires, so that every morning he or she starts their Personal Career Path where it ended the night before. Personal Career Paths comprise people's aspirations, as well as their plans and actions to make them reality. We are not suggesting that people have mapped out career paths in great detail, rather we assume they have some idea of what they want to do and what they want to achieve in life. We could think about a Personal Career Path as a series of rolling tasks, some bringing more success than others, but somehow people follow the general direction of their interests so creating a Personal Career Path. Not only does a Personal Career Path vary from person to person but so too does the distance they want to travel. Many interviewees had, or had had, career that were not related to their current Personal Career Path in farming. Although we are primarily interested in their Personal Career Path in farming, it was obvious that these other careers were often relevant to their farming careers.

It seems likely that the concept of a Personal Career Path could be applied to other people who do not get their living from farming. More could be learnt about this concept if the concept, as it related to farmers, was compared to the concept, as it relates to other groups of people, such as shop owners, general practitioners or accountants.

Having a Personal Career Path in farming is one thing but satisfying one’s motivation through this career path is something else. Success on a Personal Career Path is determined by whether or not motivations are satisfied by farming activities when the members of the farming families need them to be satisfied. Physical or financial measures of success, such as whether or not the farm business is very profitable, are not likely to be good measures of the psychological achievement involved in a successful Personal Career Path. Profitability and even sustainability are objectives (means to an end) and are probably external objectives that farmers may not embrace as part of their internal motivations.
Indeed none of the five motivation stories derived from the earlier farmer interviews included profitability or wealth creation.

Some interviewees talked about career paths in farming,

Yes, I do find it [farming] exciting…. You've got to have an appreciation of animals and the soil and the climate and your general environment in waterways and the geological formation of the country. All of those sorts of things form an ideology in your mind about what it is you want to be involved in. It’s from that sort of formation and understanding of those ideas is the reason that I pursue a career in farming (Attribution MA).

All interviewees talked about the operational aspects of delivering their careers. The two big topics were 'skills' and 'resources'. Delivering on a Personal Career Path is an iterative process. A 50-year career in farming means over 18,000 days to create and then adapt to successes as well as to failures and build skills and resources. Figure 3 attempts to describe the complex dynamics involved. The following points may help in understanding Figure 3.

- The Personal Career Path represents the passage over a working life - perhaps 50 years.
- The green box at the top (contacts advising on career) represents all the advice a young person might have on what they could do in life. However people often seek this advice throughout their careers.
- The rest of the diagram represents the decision process for one decision (or related group of decisions) and could represent what happen in a day or a couple of years.

Figure 3. The main parameters involved in career path delivery
Understanding Farmer Decision Systems That Relate To Land Use

The *Personal Career Paths* exist because farmers have unique aspirations about what they would like to do in their farming life (eg. rather simplistically: be a woolgrower, making a living on the land they own, run a successful sheep business, etc.). To make this happen farmers need skills, resources and contacts as indicated in the coloured boxes in Figure 3. We will discuss these in turn.

**Personal skills & knowledge (upper blue box in Figure 3):**
 Farmers need an appropriate set of skills based on reliable knowledge. Using skills enables the person to become proficient at certain tasks and this proficiency improves through experience and learning. The skills enable the person to create and execute a role (eg. build up a farm business). For example one interviewee noted that,

> You can have the block of land but it's what's inside your brain that helps it operate. Without that you've got nothing I reckon. We've got a set of skills entrenched in us and things that we learn and knowledge that we gather over a period of time, over a lifetime really. That's what is worth the money I reckon *(Attribution MM)*.

Practical reliable knowledge is needed and education is one option. Farmers saw skill development and education as life-long and central to their career. One interviewee remarked that education was 'just a way of thinking' as opposed to gathering encyclopedic knowledge and this captures the idea of the ongoing and adaptive value of education quite well. Indeed getting a suitable career path and keeping it on course requires a lot of thinking as well as action.

**Personal resources, land, money, etc (lower blue box in Figure 3):**
 Resources (that block of land) are also needed to deliver the *Personal Career Path*. There are many different kinds of resources needed and these come from two different sources. One source is what the farmer already has such as, money, machinery, skills, confidence, time, livestock, infrastructure and land. The other source comes through contacts with external providers; such as, bank finance, transport companies, market firms, transport infrastructure, chemicals etc. The farmer can improve their contacts to external resource providers but generally they cannot build up these external resources directly, such as developing their own banks, overseas markets or chemical firms, although a number of farmers cooperated to start the Birchip Cropping Group to conduct research. Oerlemans and Assouline (2004), reviewed the difficulties farmers face in managing such cooperative networks over time. However, farmers can build up their own resources (both tangible and intangible) and all the interviewees had been doing this. We can see this build up in physical resources as farmers go from share farmer to small farmer, to large farmer to farming baron, but we cannot see their build up of knowledge and skills or how well they are doing in terms of satisfying their motivations.

Farmers saw progress along their *Personal Career Path* as a result of how they developed and applied their skills. They also saw the accumulation of resources as vitally important, because resources influenced the scale of their operations.

**Contacts for career advice (green box in Figure 3)**
 A third group is the contacts that the farmers have that influence the development of their *Personal Career Paths*. Some of these contacts might be fortuitous but sometimes people seek professional advice on careers (career advisers in school, colleges and in private business) or seek to gain experience in a number of areas before deciding what to do in life.

**Contacts for advising and helping farmers & for supplying external services and resources (the two yellow boxes in figure 3):**
The contacts and relationships that farmers develop with other people, groups and organisations greatly influence their ability to recognise suitable opportunities and also their ability to get access to external resources to make the opportunity available to them. Two sorts of contacts are described in the yellow boxes in Figure 3.

- One related to the personal understanding and knowledge of the farmers. These contacts included family, fellow farmers, consultants, study groups, educationists, learning experiences and formal courses farmers took to both improve their skills and also discuss their proposals and businesses overall. Farmers varied greatly in the number and range of these contacts. Stone (2005 p104) found that "Successful farmers are categorised by their access to, interpretation of and application of a smorgasbord of information at a holistic business level. The vital role of agronomists consultants and some accountants is to facilitate that business like process".
The other sorts of contacts are those involved in the provision of external resources, such as finance, physical resources, transport, storage and markets (mainly business contacts in agricultural supply chains). In many cases these physical product suppliers also supply advice. However, some farmers are wary of this advice, as suppliers may not be acting as honest brokers. Advice from suppliers can have the problem of closed loop marketing, (recommending their own company's products). For instance one interviewee remarked, 

*I think it's worth quite a bit actually. As long as you're getting good advice from [name of adviser], as long as [name of adviser] is giving good advice and he's not trying to sell the chemicals* (Attribution MA).

Thus the delivery of the Personal Career Path is greatly influenced by the 'skills' farmers develop and also by the 'resources' they have accumulated. In turn, both their skills and resources are enhanced by the 'contacts' the farmers use. The opportunities farmers seek, or seek to create, are thus guided by their motivations (aspirations) but are limited by their skills and resources and by the use they make of the contacts they establish with external people and companies.

The contacts relevant for different decisions depend on which system the decisions are located within. The three-system model used in this project (see background section) and in the earlier DLUC Project is the minimum, as farmers might actually run a large number of systems during their careers. We can envisage that the suite of contacts farmers think are credible will vary as they focus on making decisions within different systems. The systems thinking approach of self-referential systems used in this model is based on Bates (1997) and can be used to illustrate the spectrum of contacts. This is shown diagrammatically for the farm business system in Figure 4 in which each self-referential system is given its own box. This indicates that the credibility of contacts depends on the relationship between systems, so that a Farmer / Market contact is a credible contact for decisions in a particular part of the supply chain (output side from the farm). Whereas the Farmer / Supply contact is a credible contact for decisions in a different part of the supply chain.

Figure 4. The relationship between systems and contacts based on a division of labour

Contacts within a subject such as sheep enterprises between farmers, suppliers and marketers could be considered as communities of practice (Wenger et al. 2002) in which participants gain knowledge by sharing information within this community. The interviews provide the evidence that farmers consciously make these contacts, perhaps infrequently but nevertheless find them useful. Some interviewees mentioned the idea of 'like minded people', which can represent a community of practice, for example,

_if you want to get somewhere the best way to do it is to surround yourself with the people who are like minded and actually, you know, they may have different set skills, sets of intelligence that you can actually lean on them or source them in a particular thing that you want* (Attribution MA).

These three concepts; systems, supply chain and community of practice, provide a logical framework for investigating the kinds of contacts farmers might find credible for a range of decisions and so
facilitate the task of extension and communication. Given the importance of using credible contacts in influencing farmers' actions, it would seem that undertaking the kind of investigation implied in this section would be a worthwhile addition to any NRM program that seek eventually to influence what farmers do on their farms.

Access to good quality productivity related advice seems vitally important for business success. Policies, market deregulation and agency withdrawn from extension are pushing the trend towards paying for advice. Stone noted that farmers in different agricultural industries varied in their willingness to pay for advice and noted that there was a danger in restricting the flow of advice and information that 'pay for service' implies. "The information sharing, which has been traditional in rural Australia is already reducing, and while this might initially benefit the holders of the information, the long term effects may well be detrimental to them and everybody else. A strong R D & E [research development and extension] capacity will be essential for enterprises and industries if they are to withstand a potential information drought" (Stone 2005 p 12). Interviewees varied in their willingness to pay for advice, some retained consultants while others did not use them.

**Tensions from family obligations**

The autonomy that many farmers have in running their own businesses is important in their ability to develop their *Personal Career Path*. An interviewee suggested that he liked the physical work of farming and the outdoor life but did not think he would like to be a farm worker as being in-charge and taking responsibility made all the difference. It was what made farming exciting.

Indications of the satisfaction farmers get from being on their *Personal Career Path* included statements about 'enjoying farming' such as 'enjoy the variety of activities and developing the skills involved', the 'feeling of competence and a job successfully completed', and 'enjoy researching potential new enterprises'. Also statements about 'being the boss', 'organising your own time', 'making choices that suit our own circumstances', gaining the benefit of your own work', 'creating your own luck', 'gearing up your skills', and so on. Others expressed the 'excitement of expansion and taking a risk' and of 'feeling the challenge of starting new things and the satisfaction of success'. Statements about making choices also indicated adherence to a *Personal Career Path* such as 'disliked cattle and got rid of them 20 years go', and 'like sheep and like working in the wool industry - it's very interesting'. The interviewees often mentioned that they enjoyed the company of people on similar career paths by saying things like 'I enjoy talking with like-minded people'.

Clearly, being on one's own career path delivered considerable psychological benefits. These included 'autonomy', a sense of being in charge of oneself: 'competency', the feeling of being effective and being proud of your skills: and 'relatedness' the feeling of belonging to a special group, a group of like-minded people (but not necessarily your farming neighbours).

The reality of a *Personal Career Path* is that other people you have to work with and family members also have career paths and their *Personal Career Paths* are not always compatible with your own. The interviews suggest that tensions exist between the obligations the individual farmers felt to themselves (their *Personal Career Path*) and obligations to family, friends and 'society' more generally. Tension can also comes from external phenomena, such as changes in laws, business arrangements or weather conditions that either help to deliver aspects of the career path or make them impossible. The resolution of these tensions seemed to be important in how farmers recognised and took up opportunities.

Possibly the most important and consistent tension in executing a *Personal Career Path* is the individual's obligation to their family. This might be demonstrated to the individual very early on in life when he or she needed to work on the farm to help out during busy times of the year. The farm has the utilitarian function of supporting the family by creating income as well as being the tangible aspect of the *Personal Career Path*. An interviewee's statement that,

> putting the family farm first is a mistake, as it is now a business and the dollar must come first (Attribution MA).

captures the importance of the utilitarian function. So the farm must perform as a business, 'we have to pay our way just to keep farming'. To do this requires them to focus on the technologies they use, their business arrangements and be cautious about the weather. For example, one interviewee remarked that,
Our consultant, he thinks this is a very high input system that if you have two bad years in a row that high inputs will just about put you out of business. (Attribution MA).

Two families are usually important to farmers during their lives and so two kinds of obligations or influence are important. First are obligations to one's parents' family; to father, mother and siblings. These obligations can last decades and can be complex especially when succession of ownership is being organised among siblings. The other family is the farmers' own family; spouse and children; and this involves different obligations or influences. The second kind of family obligation is very often closely bound to the farmer's Personal Career Path. We can see the asymmetry in these family obligations based on the passage of time as these two kinds of obligations or influences occur sequentially. The first are obligations or influences seen from the perspective of the young person starting out in his or her career. The second are obligations or influences from the perspective of adult farmers considering their own children. Obligations are based around the notion, or ethic, of 'care' but are seen from the youths' perspective as the receivers of care, then the parents' perspective as the givers of care.

Earlier work (Farmar-Bowers 2004) found that the 'family decision system' occupied the top spot in the hierarchy of decision systems and so tended to guide or dictate what decisions were made in other systems such as the 'farm trading business decision system' and the 'land ownership decision system'. In other words, the farm was there to support the family and not the other way round. The current work delves deeper into the family decision system by considering the aspirations of the individuals involved. What we are uncovering now are the tensions between the personal aspirations of the people in the family who decided to support the family by going farming (their Personal Career Paths) and the overall requirements of the family. The 'family decision system' still occupies the top spot in the hierarchy but we are now looking at the main tensions within that system, the tensions that come from choosing between opportunities to advance the Personal Career Path and opportunities that deliver what the family, as a whole, requires. For example, the Personal Career Path might lead the person to concentrate on growing finer and finer wool, that is their passion, but for the sake of maintaining family income they start a prime-lamb enterprise. The family decision system comes from the integration of at least two Personal Career Paths (husband and wife for example) and the resolution of the tensions involved.

Of course farmers can get enormous satisfaction and thrill from being successful in the farm business in terms of providing for their family (bring home the bacon for the family - as it were). This might be a very important aspect of their Personal Career Paths. There is some evidence in these interviews for this in statements such as, 'Enjoyment comes from making money', and, 'the satisfaction from achieving a big win is tremendously uplifting'. Statements such as, 'cutting back on farming to spend more time with the family', and, 'change things around to work in with family needs', and, 'don’t buy more land, you have enough to do as it is', provide an indication of the family influence. The family obligations seem to be in terms of providing income, providing time and reducing risk (i.e. increasing family security).

What we are identifying here is the influence of the family on the Personal Career Paths of the farmers and the operation of the farm as a result. We could compare this with the influence of families on the operation of large corporations such as banks or car manufacturers where the family might influence the careers of individuals (eg. CEO steps down for family reasons) but is extremely unlikely to influence what opportunities the corporation takes up.

Tensions from Social Obligations
'Social obligations' are also a source of tension. Over a lifetime people are sensitive to social change and to various degrees alter their activities in line with social mores. Social input is ongoing so that how farmers behave tends to reflect current social values (Brodt et al. 2005). On a more specific farming NRM level, Wagg and Lawson (2006) noted that "Urban and rural communities have expectations on the ways that woolgrowers manage their farms in terms of water-quality provided to cities, dust and nature conservation".

Although social obligations may take people in many different directions, for this project, we consider social obligations in only two directions. By far the most influential social obligation in agriculture is towards increasing production and quality of products, increasing resource use and creating efficient business arrangement. This direction is pervasive, so pervasive that it is generally taken for granted. It
comes from virtually every contact the farmer and their families have. Very often the influence is built into the pricing and costing systems in supply chains, making it more profitable per unit of production to be big. The other direction for social obligations to influence farmers is towards conservation and protection of ecosystems. This influence is smaller and much more disjointed. It is often cryptic, difficult to get information on, and viewed as alternative. Influence in this direction might come from personal contacts, off farm jobs, environmental programs, school or training courses. Perhaps an indication of this social influence is when a farmer, talking about his or her son's position on conservation matters, suggested that the son is starting his career at a more 'advanced' position.

Farmers do not embrace every social change, especially when they seem to make farming harder, and opposition to tree clearing controls was a case in point. Other farmers were not pushing for all out production. The interviews indicated that farmers held a range of positions on both directions of social obligations. Some farmers have internalised particular social influences while others have not accepted them.

**Tensions from external events**

The *Personal Career Path* may be thwarted by a whole host of external events that lead to compromises and adaptations. These include such things as market swings, unfavourable weather, disease, new charges and changes to infrastructure. The interviewees had 'bad luck' and 'good luck' stories as well as stories of adapting to change and 'making your own luck'. Possibly the most important factor for making good decisions in the face of change was experience; being able to read the situation. The important elements in being able to read the situation were knowledge and information, with the confidence and skills necessary to take action to respond to the change.

Farmers (as teams of husband and wife or business partners) compensated for these external tensions by improving their own skills, resources and information sources and by changing their business structures. They improved their business skills by taking training courses, and spread the risks by share-farming and organising partnerships, by adding cash businesses to their portfolio of support systems, such as contracting their services and by developing a range of income sources including off-farm income, from nursing, office work to filling supermarket shelves. They also used contractors (purchased other people’s time, skill and machinery) and advisers. To get over the fluctuating fortunes of farming from these external events, farmers explained that they 'did what we had to do to survive'.

2.3 **Lenses: the farmers’ view of opportunities that advance their Personal Career Paths**

The analysis of the interview material indicated that a certain process operated when farmers made strategic decisions that advanced their *Personal Career Path*. This process can be envisaged as viewing options through a series of Lenses. Five Lenses represent the influences that farmers take account of when they make decisions about running the farm to satisfy the motivations of their families. These five Lenses are important for policy developers since they provide a picture of the point at which programs and policies influence farmers' strategic decisions.

Farmers tend to actively look for opportunities that will advance their *Personal Career Path*. However, they also have to view these options through the Lenses of family and social obligations. Some of these Lenses help to show the *suitability* of an opportunity, and other Lenses that help the farmer view the options in terms of the external components of opportunities. This is the *availability* of an opportunity to the farmer. Questions about availability might include; is the market reliable? Can we access the resources we need such as finance and labour?

*Suitability* is about wanting to do something and *availability* is about being able to do it. As one interviewee notes,

> See, you’ve got to be realistic about these opportunities. You can’t go out there even though you want it (Attribution MA).

The metaphor of the Lenses is set out diagrammatically in Figure 5. One important point to remember is that these Lenses are active as farmers work through them by thinking and having discussions. The five Lenses focus the farmer on what they are actively seeking and each Lens excludes material that the farmer thinks is irrelevant at each stage.
Each Lens in Figure 5 represents a decision and it is possible to influence these decisions. Changing the decision at the first Lens can result in more change over the farmer's lifetime than changing the decision at the fourth Lens. This is sometimes called leverage; a high degree of leverage occurs when a decision leads to a large result in terms of the objectives (Meadows 1998). Lens 5 provides the least leverage. This is because by that time, only a small percentage of the vast array of options is still in contention, the others have been removed by the earlier Lenses. Providing a fencing grant for improving native vegetation retention is an example of overcoming a Lens 5 problem; providing an external component of an opportunity. Lens 1 is the Lens with the most leverage; if all farmers feel that retaining native vegetation is intrinsically interesting and within their Personal Career Path then the second arrow will be as big as the first. In all likelihood, the last arrow will be very substantial, as farmers will be making and implementing their own native vegetation retention opportunities irrespective of fencing grants.

The Lenses were applicable to all strategic decisions farmers took and farmers used these Lenses throughout their farming careers. However, they tended to increase their skill / ability in using these Lenses over time in a variety of ways, such as by study, experience, reflections, discussion, clarification of motivations etc. This process gave more mature farmers the ability to articulate a wider perspective of their lives and a clearer view of developments that were satisfying their family's motivations.

Figure 5. The Lenses used in seeking and identifying an opportunity that is relevant to the farmer

Many of the programs of Victorian Government agencies use incentive schemes and regulations aimed at overcoming problems at Lens 5 (knowledge of and access to external components of opportunities). Social marketing to bring home to the individual what is currently socially acceptable is aimed at overcoming problems at Lens 4. While all these approaches are very important in NRM, our focus in the current project is on the complete range of Lenses and specifically how programs and policies can be used to influence what farmers see through their Lenses and thus what actions they take. In shifting the focus from understanding how farmers view or recognise strategic opportunities, to considering how external organisations, such as government agencies, can influence farmers' view of strategic opportunities, we have to shift from the concept of Lenses to a new concept we call BOXES of influence.
2.4 BOXES of influence

The concept of Personal Career Path captures the internal emotions that lead to people being interested in specific things throughout their lives. There are huge variations in Personal Career Paths, because they start with an intrinsic interest and people have a very wide range of intrinsic interests, some are interested in music, others sport, or animals, or chemistry. Every day they can do things that either enhance that interest or bury it. What we are suggesting is that generally people prefer to follow their intrinsic interests and, if possible, pursue a career that relates to that interest in some way. People may have many false starts but tend to come back to a particular set of interests. All sorts of things might influence the passage of a Personal Career Path either towards or away from intrinsic interests. We are suggesting that these influences can be grouped into seven areas. Figure 6 shows these seven influences diagrammatically as BOXES. These seven BOXES represent a different view of the five Lenses; farmers see opportunities through the five Lenses, but the rest of the world creates changes that influence farmers and these influences can be grouped into seven BOXES that approximately equate to the five Lenses.

Figure 6. Personal Career Path with items that might influence it grouped into seven BOXES.

Education and experience, and obligations to the farmer's own family (the 2 yellow boxes) can become intertwined with the person's intrinsic interests to establish a Personal Career Path. In other words, changing education and experiences and changing their family situation can lead to great changes in their Personal Career Path.

Perhaps a good way of visualising the BOXES in Figure 6 is in terms of their position in influencing goals on an intrinsic and extrinsic continuum. Motivations that are tightly held can be described as 'intrinsic' that is they are generated from within the psyche of the person, this is BOX 1. Other goals can be 'extrinsic' that is adopted from other people or society generally, these can come from influences in BOXES 2 to 6. Deci and Ryan (2000) as part of their self-determination theory noted that there was a continuum running from intrinsic to extrinsic motivation and on to amotivation with a corresponding behaviour running from self-determined (autonomous decisions) to non-self-determined (decisions controlled by others). BOXES 2, 3 and 4 would tend to be towards the intrinsic side of this continuum because young people are quite likely to accept other people's ideas and internalise them to a degree. BOX 6 would be at the extrinsic end of the scale.

Extrinsic goals tend to be instrumental and are dropped relatively easily when the external pressure to comply is reduced, whereas people will be less easily put off when they are striving to satisfy an
Intrinsic motivation. Intrinsic motivations are so important to them they will keep on working at them despite difficulties.

Smithers and Furman (2003), in discussing the question of 'enduring change' suggested that extrinsic forms of motivation such as financial inducements are more transitory in their effects than intrinsic motivations. They found that farmers ranked intrinsic motivations much higher than extrinsic motivations as reasons for their participation in conservation planning programs. They noted that their findings were consistent with findings in research in the European Union that participation in voluntary programs tends to be motivated by intrinsic concerns. The higher decision system in the mental model, the family decision system, is more likely to be driven by intrinsic motivations than systems lower in the hierarchy such as the farm trading business system which has an instrumental purpose.

In the next sections, the seven BOXES in Figure 6 will be used to discuss in detail what things influence progress along the Personal Career Paths and the relationship between these influences and how farmers identify strategic opportunities. However, it seems likely that the influences grouped into these BOXES accumulate and are not as separate as the diagram indicates. We are separating them just to facilitate discussion. The discussion focuses on the direct influences of government agencies, which tend to peak in BOXES 1 & 2 and 6 & 7. The influences of industry and commercial interests tend to peak in the middle BOXES. Of course government agencies may influence farmers indirectly by influencing the actions of industry and commercial interests.

Starting point: BOX 1
The starting point or basis for a Personal Career Path seems to be the farmer's intrinsic interests (e.g. 'always been interested in animals') and is supported and enhanced by how the individual responds to early experiences and lessons learned at home. Plowman (2006) noted that "Behaviours embedded in our formative years are generally unconscious and are also highly resistant to more recent influences". Working in a career that involves intrinsic interest leads to sentiments such as 'I love farming', 'I enjoy it and enjoy working with sheep' (or whatever their interest is). Also 'I wanted to feel OK about the job', 'I developed my affinity for sheep in my adolescent years' and 'I love the challenge of farming -I like the adrenalin flowing'. Farmers' intrinsic interests often include nature and being involved in conservation can become a recurring theme. For example, in a study conducted in Wales, Wilson (1997) noted that once farmers joined a voluntary conservation scheme they tended to stick with it even as the scheme changed.

The farmer's parent's family (mother, father, sibling and other relatives) is likely to have a great influence on creating these early experiences and providing the atmosphere in which the young people can respond. This can come through encouragement - 'the kids had a good time playing on the farm and helping move the sheep' and 'my father was always up beat about farming'. Also,

We had chooks as well, like chooks and ducks and turkeys and all that sort of romance of getting the ducklings in and milking the cow, [and], I also reckon that every farm should have livestock because of the next generation [it encourages them to go farming] (Attribution MA).

But it can come from discouragement -

We tried to be neutral with our children but our neighbours actively discouraged their children from thinking of farming as a career (Attribution FA).

McCormack (2002), suggested that children create their own ideas about rural life in many different ways including from their own material experiences and discursive interactions with 'rurality' noting that the acquisition of knowledge to produce their constructions of rurality were often shaped or constrained by family activities and discussions.

Several interviewees suggested that there was a social stigma about farming as not being a good job. One noted that,

People think that farming is for dumb people and for peasants; it's a lowly occupation, to get dirty (Attribution FM).

Other interviewees said they known girls who had said that they would never marry a farmer. Despite this social stigma, growing knowledge and personal experience is likely to help define and make the Personal Career Path in agriculture more specific, 'I realised that there could be a career in agriculture'.
Education and experience had an ongoing importance in helping sort out what they wanted to do. For example, working on a cattle station as a young man was a factor in one farmer seeking a cattle enterprise to enhance the viability of his sheep farm. Lack of experience seemed to restrict what options the farmers would consider, one interviewee noting that they 'only know how to grow wool'.

The start of a career path suggests the direction of the career (i.e. farming as opposed to some other career) it also seems to indicate just how far they wanted to take their career. Was their career path just to be a 'woolgrower' or was it to be the 'biggest' or 'best' woolgrower? It was evident that some had an ambition to take their career to some definable point, to reach some particular position (and perhaps exceed this point). Quality of wool was one of these points. Others included business success, financial security, social standing and also variety and excitement in life.

Cattle are also grazed on some farms

Secondary & tertiary education, experience and knowledge: BOX 2

Education was seen as a really important part of career development. It was mostly expressed by parents about their children in terms such as, 'important to keep up the technical side of schooling'. Working off-farm, doing an apprenticeship and going to college were important rights of passage back to the farm. While most parents said they wanted their children to pursue their own careers - and the majority of their children seemed to be leaving agriculture and making careers in other industries - most farmers seemed to think that having at least one child coming back to the farm was a good thing.

Education and knowledge development follows as routine. It starts by building on knowledge from the farm business run by their parents. This is problematical when the farmer's career path differs radically from his or her parents. In these cases gaining information and, 'know-how', quickly becomes critical. But two important points are evident, as indicated by the comment, 'hard to find out what to do', and, 'lack of time to look for solutions', that fitted their farm and objectives. Education and know-how are vital elements in developing the ability of farmers to see opportunities. Many farmers interviewed were actively involved in improving their education and learning about farming and developing farm business skills even though they were quite well established in terms of their farming careers. Some said they went on courses or educational trips (often organised by themselves) every year, and a number went overseas. Growing competence, based on education and experience, was like a 'shadow' on the Personal Career Path as it was always present, sometimes racing on ahead, sometimes behind.

Education and early experiences seemed to be the starting points for developing contacts, especially contacts for giving advice and help on developing personal interests and skills. Most of the learning
that occurs during a farmer’s career was aimed at ‘finessing’ his or her chosen path rather than looking for radical changes. Farmers were learning about wool or wheat futures so they could reduce risks, or learning about fertiliser rates to improve pasture growth, genetics to improve the flock, or courses on whole farm planning, farm management and succession planning. They were not seeking information for radical change. For instance, one interviewee when talking about farmers in the neighbourhood noted that,

we couldn’t actually get people to change their system which is a combination of all those things. They’d be quite happy to put a bit more fertiliser on or change a chemical, because that was sort of finesse…I mean some people’s farming systems are just completely fixed in their heads (Attribution MA).

Frequently farmers mentioned the importance of ‘personal contact in learning’, having an agronomist out to discuss the issue on the spot, or having access to scientists working in a particular topic or even just observing researchers conducting trials. The crucial part of ‘education’ was being able to relate it specifically to their farms; it had to be relevant to their objectives and useable. Some farmers mentioned trying out new crop varieties and farming practices on their own volition. Others mentioned the importance of data they collected themselves about their own operations. This could be facts and figures or descriptions of what they did. This information could provide a source of farm based information enabling them to, ‘do it themselves’, and improve their own skills and hence their farm’s performance. Many appreciated that keeping records, collecting data and making written descriptions of their practices would allow in-depth analysis that would help them in later years make more informed and hence better decisions about their farm practice.

Obligations and influences of parent's family: BOX 3

Obligations in the parents’ family seemed to be important in determining the subject and perhaps the scale of ambition in the Personal Career Path. Some influences might be by example, while others might come from the degree of encouragement given by parents. A consideration might be staying in the parent’s home, although moving physically to another house was a strategy described by a number of interviewees. It seemed to be a step towards personal autonomy that was vital for building the confidence required for making decisions. Some farmers had a slow transition to ‘being in change’ and taking over the practical, financial or technical aspects of this change. Succession planning was a major topic in many interviews. One interviewee noted that they seemed to have, been involved in succession planning all their lives (Attribution FM).

A number recognised that poor succession planning could cost relationships.

Although succession often resulted in siblings going their own way, in some cases siblings formed long-term farming partnerships that provided many advantages. One advantage was the range of skills and contacts available within the partnership. Often siblings develop different skills and interests or gain different skills on purpose by developing their comparative advantages. By running their businesses jointly partners can gain economies of scale and flexibility in the physical work involved in farming. Even after dissolving partnerships the flow of information between relations remained helpful to both. For some farmers having quite distant relatives farming in the neighbourhood was helpful, I go and talk to some of my cousins who farm in the region (Attribution MM).

It seems possible that a slow hand-over of control between generations would tend to encourage conservative management. Some interviewees noted that as they got older they tended to management their farms to hold on to their achievement (wealth maintenance) rather than be more adventurous and try new enterprises. Some noted that bringing a son or daughter into the farm business would lead to a period of rapid change aimed at growth as one interviewee noted, that would be a very exciting time, it would be great (Attribution MA).

This is supported by empirical evidence that indicated that younger people were more likely to start new businesses and be active in existing ones, partly because they have the time left in their careers to reap the rewards of their efforts (Lévesque and Minniti 2006).

There were several dangers in inheritance. A disadvantage for young people, in working on the family farm for parents or for the estate, was not having their contribution towards running the farm recognised. It seems important to sort out ownership early so that the individual can build his or her own farming career and keep the rewards of their own work right from the very start. This is what
happens with sons and daughters who leave the farm and work in the city, they can develop their city-based careers and keep the rewards from their own work. The other disadvantage stemmed from the anticipation of inheritance. One interviewee suggested that

waiting to inherit is a corrupt way of life [principal because while waiting they] don’t make the best use of opportunities, - they don’t make their own luck (Attribution MA).

Sometimes there was a considerable carry over in terms of inherited techniques and approach to farming with some interviewees noting that what their father had done was still the best. Others differed, claiming that, 'a lot of things my father did were just not commercially viable ways of doing things'. Some felt a considerable responsibility to keep the farm going in deference to family history and consequently they managed the property conservatively to avoid bankruptcy so that they would not feel that, 'I've let all those previous generations down in some ways'. Others felt stimulated by family history to be adventurous,

we'd been here since settlement, four or five generations. I just suddenly felt a yearning inside to be part of it (Attribution MM).

'Separation' seems to be an important concept to describe what is happening. People need a psychological separation from their parents' family (young people from their parent's family) and from their parents' farm too. This separation gives them some objectivity and helps them see opportunities that are appropriate for their own career paths. The right of passage mentioned above could help secure this separation and help them become more autonomous - making their own decisions to satisfy their own goals. One interviewee mentioned that he told his son that the farm was 'not a Garden of Eden'. Having this separation means the farmer has a greater degree of objectivity that helps to identify his or her own problems and create innovative solutions.

Obligations to Own Family: BOX 4

In some circumstances separation from the parents' farm was not an option as there was not enough income from the farm for the sons and daughters to stay. This opens the question of how people start out in farming. Some interviewees argued that it was virtually impossible to start from scratch in farming these days and help from the family was required. Even some who already had a start in farming ran other businesses to generate income to finance their move into full-time farming. This gives the truth to the comment that they were, 'not going for the money - it was accidental to the challenge'. Some fought hard to get or create the opportunity to start farming and build a farming business that was 'viable', meaning that it would support their family.

Obligations to the farmer's own family (spouse and children) become intertwined with the farmer's personal career path to the extent that they become integrated, harmonious or compatible. This contrasts to the obligations to the farmer's parents' family, which are more of separation and increasing autonomy. For many families there are two personal career paths involved in running the farm (husband and wife) and while there was considerably overlap (especially their personal career paths that concerned farming) their personal career paths are very unlikely to be identical. Often husband and wife have shared aspirations for planning their farming careers, raising their children and sharing the farm work, family work and business according to their ability and aptitude. Both partners may have off-farm jobs but sometimes one (husband or wife) had full time employment off the farm for a number of years leaving little time for farm work. Interviewees made many positive statements about marriage partnerships improving stability, skills and decision making.

A marriage partnership seemed to have a number of influences. It seemed to provide a dialogue prior to taking important decisions, 'we have robust discussions on all big decisions'. An interviewee without this partnership noted that they would like to be able to talk over the pros and cons before making important decisions in this way but talked with friends and neighbours instead. It seemed that working closely with a spouse was recognised as very advantageous, especially in difficult times, as it provided emotional support or 'stability'. The family influence seemed to determine the effort made to enlarge the farm business and accumulate assets.

This kind of partnership also seemed to make the farming family more open to social influences. Wives very often worked off-farm for at least some of the time and this ongoing contact seemed to be beneficial in terms of keeping the family 'socially aware'. This might have a focus on children and home but undoubtedly involved farm management. A number of wives were outgoing and this provided a complementary role in the farm business, '[she is] very good with people'. Sometimes the
Interviewee mentioned that partners developed skills in their own careers outside the farm that were relevant to the farm business such as accounting, finance, computer and people skills. Many wives seemed to be involved with ‘office work’ while their husbands specialised in physical outside work. Marriage partnerships also provided the possibility of the wife providing ongoing long-term off-farm income and this could even out income flow when the results from the farm business were low. It seemed likely that having a regular income reduced the risk of farm bankruptcy and might also help the family decide to take on more debt to finance farm expansion. Some of the men interviewed had had off-farm employment too but it seemed that they were more likely to stay within agriculture; taking up periodic opportunities to work for cash (wool classing or shearing) or creating subsidiary businesses that improved cash flow. One interviewee noted,

*I think that’s something that we’ve probably learnt recently is that of that off-farm income is a good thing to have because of that risk management aspect of it* (Attribution MA).

Children also influence the farmer’s career path. The need for a steady flow of money and more time to attend to family matters might result in the farmer trying to create a period of stability and consolidation in the farming business. This might last fifteen or twenty years but eventually a new phase begins when the children of the farmer begin their own career path by working on the family’s farm. When this happens there is the possibility of the farmer’s Personal Career Path becoming separated from the farm as their children take over control. It gets to the point where the farmer will have to ask as one interviewee put it,

*Do I need to be there?*, [you] *think you are indispensable - and you are not*. [Stepping out of management will help] the next generation finds its own way (Attribution MA).

The farmer may continue to work on the farm but the executive decision-making has moved on. The time the farmer expects to be at the helm may be quite long. *I want to grow 50 wheat crops in my life, - that’s my plan*, the point being that there is a time scale incorporated with Personal Career Paths. Some interviewees were adamant about moving out of farming, ‘We don’t want to be farming at 70’. This signifies a big change point in Personal Career Path. It is something that is inevitable and needs to be planned for but also something quite dramatic as the efforts and emotions in succession planning suggests. The idea of joint career paths and separation from the farm is shown diagrammatically in Figure 7.

Farmers usually have interests outside farming but often the farm is the principal physical expression of their Personal Career Path. This has consequences because strongly (emotionally) linking the career with a physical asset may mean that the use of that asset is tightly held against the core of the career path. This can be recognised in statements such as,

*I would not like to lease land as I don’t want to see my work undone [when the lease expires]* (Attribution FM).

Also, a number of interviewees suggested that personal land ownership encouraged them to undertake long-term improvement programs, whereas leased land tended to get ‘flogged’. In contrast, farmers who leased a lot of land suggested that they had arrangements with the owners that involved making sure the land was not only maintained but also its productivity was actually improved. Some farmers expressed a more utilitarian sentiment about ownership and leasing, saying that they prefer to own land as opposed to leasing so that they could capture any capital gain. Land was recognised as a valuable asset and some farmers were reticent to change the property too much. Farms can run down in terms of productivity and infrastructure and some interviewees commented on the problems and high cost of repairing and restoring these places. The perspective gained from the interviews was that those farms run by the owner were more likely to be run down than farms that were leased. This is an issue in terms of maintaining production from the region and also for improving NRM. One aspect of land degradation was the spectre of decreasing water quality. The impact of farm ownership arrangements on land degradation may be of growing importance as the practice of leasing land seems to be a growing development. In the United States over half the cropland is rented and cash renting (as opposed to share farming) is a growing trend. Carolan (2005) has addressed the issue of sustainable farming in terms of rented land in the USA and suggests that renting may be inhibiting the move to sustainable farming practices.

Some interviewees noted that they soon gained an emotional connection to land they purchased so that they became reluctant to sell it. They suggested this was partly because selling up or even making large changes to their farming systems was an admission of failure. Changing once you have set your own course is very hard,
because it means admitting the fact that you’re wrong and you’ve got to set off in another direction (Attribution MA).

Figure 7. The relationship between Personal Career Paths and the management of the farm.

Land is an essential asset in farming although ownership is not essential. Land ownership was one of the central issues for the interviewees. They talked about it in practical as well as in emotional terms. Knowing how farmers relate to land might help in understanding the relationship between land and natural resource management. Four alternative views were raised about land ownership and these are discussed next.

1. Land was seen as wealth and so many if not all interviewees saw land as a useful asset for superannuation or inheritance. Owning land was seen as a good thing, something people, including farmers, aspired to. Many interviewees talked of the price of land and the recent capital gains. When farmers focused on the idea that the capital value of land was more important that its use as a productive asset there seemed to be less emphasis on maintaining the land because they understood that land would still increase in value even if it became degraded through poor management.

2. Land area determined the size of the farm business. Many interviewees talked about the difficulty of getting access to land, that it was tightly held in their region, and how they had to look further and further afield to get land. However, many farmers also talked about productivity and how to increase the business profit by changing the farming systems they used. Mainly this involved intensification, more inputs to gain more outputs. However, the alternative option was also canvassed. This alternative involved using fewer inputs which meant the output would be less but a difference between the inputs and output would be bigger so profits would be larger. Overall this perspective means that land is credited as a productive asset and likely to be managed with this in mind, and ideally managed in accordance with its capability. We would expect farmers who held this view to develop whole farm plans and reorganise their farms accordingly.

3. Land is considered a productive asset, along with capital, against which farmers could gear their skills. This meant that many different kinds of business arrangements could be used in order to gear the farmers' skills against land and usually against capital too. The production from the land directly involved in these arrangements would tend to be increased, as the sale of products is what allows the system to function and pay its way. Other land on properties involved in these geared business arrangements that do not meet the requirements of the farming systems may receive little management effort. In terms of a cropping system one interviewee noted that their entire farm would fail to meet the requirements,
Our farm doesn’t lend itself... to bring in big contractors, just because of the undulating country and stuff (Attribution MM).

Some farmers saw their Personal Career Path being advanced through the means of improving their "skills" rather then being advanced through an increase in a physical entity such as "the farm". In other words, they farmed in order to build skills, rather than built skills in order to farm. "Skills" became the asset they were building their Personal Career Path on, rather than building it on the physical asset of the farm. There is no doubt that physical assets (farmland) represent wealth, but skills represent income. For example, an interviewee’s comment that, I think there’s a career path in agriculture even if the farm went broke (Attribution MM).

implies the value of skills. The physical expression of the successful use of skills then becomes income, and wealth is expressed by the accumulation of investments rather than through ownership of the farm. For example one interviewee noted,

if you are in the banking industry, people don’t expect you to own the bank, but if you are in the farming industry, they expect you to own the farm. Now why is that? (Attribution MM).

In a sense this is an extension of the gearing concept. In this case, it is about gearing skills against other people's physical assets. It may be a growing way of thinking about farm production. It recognises the reality that farmers may be asset owners but success comes from being professional managers and applying technical and management skills effectively.

Farmers know that they have to be active to run their farms as nobody else has this responsibility. They have to be active in looking for opportunities and this includes actively looking to improve their skills. They want 'know how', such as, how to rear young stock, how to move large mobs of sheep without losses, how to improve soils, how best to structure the business and asset ownership. Once they have these skills they use them, but this does not imply that they know exactly what skills they need; there is a degree of exploration.

In the DLUC Project a systems-thinking approach was developed that separated the farm trading business system from the land ownership business system (Farmer-Bowers 2004). Money could be made in both systems but in different ways. The third approach to land (noted above) is about farmers recognising that they can use their skills in farming to make money in the farm trading business system quite independently from owning land.

Most interviewees appreciated that owning farmland could return a profit without having to apply farming skills. Income was available from leasing and in the form of capital growth when they sell. Recent capital growth on farmland has been substantial. One interviewee noted that, 'most times these days your annual rate of return on capital growth is actually greater than the annual return in cash' [annual return means income from farming the land].

This third approach to land is likely to increase the division of land between productive and less productive uses and also make the management of land less dependent on the skill of the owner.

4 Land is also considered as something of a public asset that the farmers are managing for a time but do not 'own'. With this perspective farmers are more open to considering the impacts of their management regime on external things such as landscape and catchment values and nature conservation. One interviewee asked, I just really have problems with standing there and saying.... does this farm look really attractive from this angle?’. [Or] I’m having a personal problem with my economic grain against my social grain – in that we’re told by the powers that be that we should approach 10% biodiversity as a benchmark (Attribution MA).

Farmers might hold several of these views about land, and their views might change over their careers (eg. the superannuation view might come in later life). Some of these changes might stem from what is happening to the farmer's career.

Although we can envisage the Personal Career Path as more or less continuous during the period of running a farm, information from the interviews indicated that farmers sometimes took diversions to solve a particular problem. Diversions were related to the need to maintain cash flow and also to
generate capital to help create or maintain a career path in farming. Diversions could be relatively small excursions, for example, moving from mainlining wool production into prime lamb production for a time to maintain income as a result of high meat and low wool prices, or leasing land to gain economies of scale to offset particular costs (such as machinery). These diversions could also involve leaving farming for a time (or leaving the farm for a time) to build up capital in another business before returning when their capital position has improved, or when the income crisis is over. The alternative businesses sometimes last years or may become permanent. Farming is seen as the prize with the other business being the means to this end.

Vineyards are an alternative land use

Social obligations: BOX 5

Although interviewees did not have a distinct conversation category called 'social obligations' it was an important topic that was raised frequently in the interviews. There was a variation across the interviewees in how they responded to changes in society.

The interviewees expressed a range of views about social issues that appeared normal; nobody expressed extreme opinions. A good understanding of social issues and changes probably gives a family an advantage in developing Personal Career Paths and also in business. The issue seems that developing a Personal Career Path required using social contacts but also going against many social norms in order to have personal success. One interviewee mentioned a technique to keep a strong personal focus,

*When folks are negative – and I try and avoid negative people, they just drag you down* (Attribution MM).

Social understanding comes from interaction with a range of people coupled with reflection on events. It seems likely that the more networks they have, the wider the range of issues these networks embrace and the deeper or more intense their interaction, the more they will understand social issues and change. Participation in networks seemed to vary a lot among farmers and also the role they took in networks varied too. Some tended to take leadership roles in most of the networks they were involved with while other farmers were content to be members.

Many of the interviewees mentioned some aspects of networking, either with formal networks or being aware of changing standards and how other people lived. For example, many interviewees mentioned the value of travelling for seeing how other people live and being involved with people different from themselves. Examples of this involvement include travelling overseas (especially for work rather than for recreation) working inter-state or having a job in another industry, or working in the city for a time. One interviewee reflected that the experience of travel and meeting other people,

*it grows you personally, which is important, very important and it actually – when you go to the West or to Canada you listen to other people talking too and that also grows you pretty substantially as well* (Attribution MA).
It is likely that tertiary education helps widen people's awareness of the diversity of people and the diversity of views and objectives that other people have. However this has a different intent from the kinds of concepts, such as 'technologies of agency (eg. capacity building) and performance (eg. statistical measures) that government agencies might apply to create behaviour change as discussed by Higgins and Lockie (2002). However, the content may appear similar. For example, farmers are generally motivated to improve their own capacity as a tool for helping satisfy their own motivations whereas government agencies may help in capacity building believing that a better informed farmer will be able to make more socially responsible choices.

From a business perspective a good understanding of the diversity in society, especially in business circles, is likely to assist the farmer in appreciating changing requirements and changing relationships between organisations in the supply chains that they are involved with. Knowledge will most likely help them take advantage of change and be in the vanguard of a response to change rather than waste resources trying to fight it.

Knowing social trends can help farmers in their efforts to satisfy their motivations. For example, keeping up to date with marketing trends can help farmers recognise possible marketing opportunities. Appreciating the trends in local demographics and changing sentiments in regard to native biodiversity can help farmers create opportunities in land subdivision and sales.

Farmers expand their social networks in specific areas by joining or establishing groups. Some groups such as the fire brigades and landcare are well patronised by farmers. But farmers also belong to other industry groups and also participate in research programs, some of which are ongoing and give the farmer an ongoing contact with scientists and people with different backgrounds.

Important social contacts occurred in off-farm jobs as they provided the opportunity for appreciating how people behaved and what things they valued in a variety of situations. While the husbands did take off-farm jobs, these jobs were often related to agriculture such as contracting machinery in cropping, or wool classing and sheering. Others took on jobs within the agricultural supply chain like transport, meat and grain trading. The wives often took off-farm jobs related to their own career path such as teaching, nursing, banking, office work, tourism and local government authorities, that took them into different industries and professions. This breadth of experience seems likely to provide the married partners with an opportunity to gain a deeper understanding of social trends and the range of views and aspirations within different communities. This experience may be especially useful in retirement planning.

A number of farmers commented about the decline of small towns. Ararat had experienced hard times following the closure of local industries but seemed to be doing well at the time of the study. Other towns that were more dependent on agriculture were not doing so well and this decline led to reduced services (medical, shops and banking) but also in sport and recreational opportunities. Perhaps the declining population in small towns meant that farmers would have to be more active in seeking contacts.

**External influences: resources, labour, markets and regulations: BOX 6**

We have suggested that there are two kinds of components in opportunities. One kind is referred to as personal components and the other as external components. To obtain an objective view of external components of opportunities we would have had to interview all the other groups involved, such as financiers, regulators, and supply chain companies. By interviewing farmers we gained their perspectives of opportunities, which is mainly the internal components. This is the part they know best, but we also got their perspectives on external components of opportunities. In BOX 6 we refer to this information as 'external influences' not 'external components' because we are getting the farmers' perspectives rather than the whole story. Their perspective is vital of course because it determines how they respond to opportunities. People can only respond to how they perceive things to be.

What we can get in this set of interviews is an overall picture of farmers' perceptions of the external aspects of opportunities. By not focusing on any particular aspect we gained a picture about what aspects were of greatest interest to farmers at the time of the interview.

The interviewees talked most about resources and labour. These were linked as many farmers were expanding their business and the main resource being discussed was land, and often capital to purchase...
Understanding Farmer Decision Systems That Relate To Land Use

Land purchase or sale was a very significant event for farmers. Some referred to land purchase as a 'once in a life-time opportunity'. There were several difficulties, which included the un-availability of land. Mostly they talked about suitable land to expand their business as being 'tightly held'. They could not just add land to their business as they wanted, it was just not available, but when land came up for sale they had to act, 'ready or not'. Some talked of developing a 'war chest' so they could be ready to buy land when it came on the market. An important aspect of land purchase was the pre-existence of the decision to expand the size of their land holdings. They already had ideas about what land they would consider buying; how they would use the land, about its location, quality and cost. This pre-planning meant some farmers were sensitised to the real estate market and ready to act when land was offered for sale. In some cases they went to the owner before the land was on the market (some had a lease agreement first). A similar scenario applied to large leases of land, the difference being that the 'would be purchaser' had decided that they could not afford purchase. Farmers realised that they could lose money on land purchase if they owed too much money on it, as the interest was likely to be greater than the profit from farming. Land is a form of wealth and represents long-term security. One interviewee remarked that,

\[\text{It was just outside the realms of common sense to buy land and in the process jeopardise the assets that you already hold} \ (\text{Attribution MA}).\]

However, farmers were usually buying land to expand or complement existing enterprises. This meant that a purchase could be justified by what it could bring to the overall farm business. New land could complement the land they already owned. Additional land could complement the farm business by increasing the scale of operations and improve the efficiency of existing infrastructure. It could also increase the productivity of labour and management skills. In some circumstances owning land in different regions with different rainfalls and soil types could provide additional advantages.

Although size of the land parcel being offered was important, interviewees mentioned deals in which they were able to obtain the parts of the parcel that suited them best - deals with neighbours and fellow purchasers. For some, the size of the parcel required depended on its distance from the 'home farm'. The larger the holding the further away it could be. Some farmed land hundreds of kilometres from their home farm.

One of the basic problems was seen as the high cost of land relative to the income that it could provide in terms of agriculture (sheep and cropping). Even land in the very best of condition and managed well would only provide a return of a few percent on its capital value. The capital value of land was said to be high because of demand for other uses such as grapes, plantations (mainly blue gums) and 'recreational use' (especially smaller allotments - country retreats - life-style). Some said that growth in the capital value of the land in recent years had been substantial. This may have been one of the main reasons why most interviewees said they would prefer to own land than lease land. They said the cost of leasing was not much less than the cost of purchasing.

The cost of land relative to the income derivable from farming meant that it was very difficult if not impossible to start in agriculture from scratch. However not all land owners were fully competent farmers or wanted to spend their time running farm businesses and this provided opportunities for people to get into farming or expand their businesses without owning land. Some interviewees had expanded their businesses this way and profits came from gearing their own capital, machinery and labour costs over a bigger production base. The overall consensus was that purchase was preferable to lease although these comments about gearing raised some alternative views.

The other topic the interviewees raised was labour - specifically the importance of getting skilled workers who care about their work,

\[\text{I need someone to be cooperating and to be using their intelligence for me} \ (\text{Attribution FM}).\]

Also,

\[\text{The biggest issue farmers have got going forward is probably capacity to pay and find good people} \ (\text{Attribution MM}).\]

The interviewees used a large number of strategies to achieve this, indicating that it was a very important aspect of farm business. The concept that describes this situation is getting workers involved. Involvement was the key.
Traditional techniques to get involvement, such as share farming, were employed. This is not strictly an employer-employee relationship but it certainly delivers positive results. Other arrangements included managing properties and charging a fee for that service. Some were doing this and others were contemplating this arrangement as a way of employing their skills in farming separately from owning land directly (that is, gearing their skills). Contractors would do the actual farm work. However, a variant of this would have the consultant managing the farm with the landowner actually working the property. This would ensure worker-involvement because the owner would be the worker so they would obtain the trading profit as well as the capital gain on land value that accrued as the farm become more productive. Another option used was land leasing where the owner put in resources (other than the bare land) and gained a smaller lease return but a larger capital appreciation because of the farm improvements. A variation was having the owner of the leased land actually work for the lessee on their whole property on a regular ongoing basis. Another kind of approach to get involvement was various forms of profit sharing. This ranged from giving the employee an equity share in the whole business to some from of harvest bonus. One form of harvest bonus was using some of the employees own land (employees often own small farms) as part of the main business so that they would earn a bonus from the sale of products off their own land. Another was giving them a number of stock (the animals were not actually identified) and the employee obtained the profit (or loss perhaps) that was accredited to this number of stock. There may be many different arrangements to get employees working effectively.

One interviewee noted that farm labour had traditionally been paid low wages but that things were changing as farmers geared their businesses and could afford and needed more effective workers. The interviewees noted that employees needed more than a good wage. One requirement was interest and training. To keep employees interested one interviewee said they worked through the entire production cycle. This meant that workers would appreciate how each job contributed to the overall result and also ensure they had a variety of jobs during the year. The other non-wage aspect was free time. This included set holidays and guaranteed time off each week irrespective of how busy the season was. This approach acknowledged the importance of home life was for employees. The third aspect was continuity of employment; both employee and worker wanted ongoing reliable work. This was especially important, as alternative employment in the country was limited.

Markets in products were clearly important but generally the interviewees could only respond to market trends as they were selling commodities. A number of interviewees were participating in futures markets as a way of hedging their income but with mixed results. However, interviewees tended to be active in investigating the options in the market to find good deals. Sometimes these were one-off deals but some had developed ongoing arrangements with agribusinesses.
The market in purchasing was more flexible and some interviewees with large businesses said that they were able to buy at increasingly better prices as the value of their purchases increased. Overall they could make better deals with suppliers. However, price for some farmers was not the determining factor for choosing the supplier and the combination of price and on-ground service and advice was very important. This was especially so with agricultural chemicals where technical advice was very important. Farmers used agents a lot but also dealt directly with other farmers. It seemed that farmers who were expanding their businesses were more inclined to think of developing ongoing arrangements with other farmers, perhaps to ensure continuity and quality of supply. All interviewees appreciated the importance of reliable contacts. The market for land was quite different since there were fewer buyers and sellers. Private negotiation was especially important for lease agreements.

Although external influences are beyond the control of farmers they can improve their understanding of external influences and increase the number of options they have available by increasing and maintaining their network of contacts and by using the knowledge that these contacts can provide.

End of career: BOX 7

In our concept of Personal Career Path we noted two things that are important towards the End of career. One was the separation of the farmer from active management of the farm. This transition could take some years if it involved transferring the farm and its management to the younger generation. Succession planning was a big issue for most interviewees. It was often complex and took emotional energy to negotiate suitable arrangements. Many interviewees were actively involved with succession planning. Some interviewees were taking up farm management while others were handing over the farm management and ownership. The other aspect was that there were two Personal Career Paths involved in a marriage partnership that guided their farming enterprise. Both these people were likely to have pursued a farming career for a period but quite often one would have an off-farm career as well (one spouse might work as a nurse or teacher etc). In a number of cases both careers were running as the End of career approaches.

An interesting variation is when siblings run the partnership. In this case the End of career might come for reasons other than age. For instance one interviewee mentioned,

I worked for 17 years in partnership with my brother... When our sons became interested in land and farming as a career...[we agreed to] dissolve our partnership and allow each family to get on and farm with their offspring. So that's how it's developed (Attribution MA).

The principal impression the interviewees gave was that they did not treat farming as a means to some other end. They were not accumulating wealth on the farm so they could sell up and move on as soon as possible to some other occupation that was 'real life' for them. On the contrary, some had run other businesses to build capital so they could get into farming and while they were realistic about the farm business having to yield a decent income they also tended to think of farming as an 'end in itself'. In terms of their Personal Career Path they had chosen farming because of their intrinsic interests (BOX 1) and had stuck with it during their working lives, so farming was a major if not their principal interest (an end in itself). Consequently the End of career was often full of dilemmas. One interviewee expressed this sentiment well,

I am not going to get $5 or $6 million of land out of this, the only thing I am going to get out of this land, what I am getting out of it is lifestyle so I may as well have my comfortable home and I may as well have my space down at the beach and I may as well go on an overseas holiday because at the end of the day I am not selling it. I am just going to pass it on. Yes, it is not for the money. It is not a money thing.... [Dollars] is not what I see flashing up at all. I just sort of see, I am enjoying what I am doing I am happy here....and that is what is important to me. Having been able to have good discussions and a lot of fun together, rather than at the end of the day we are going to sell out and then have a life. Well it's not going to happen. If I sell out I would be miserable I reckon (Attribution MA).

One can see why many farmers wanted to stay farming but on the other hand, some of the interviewees, aware of the physical and emotional stress in farming, were adamant that they wanted to retire at a reasonable age (say mid 60s or before 70). Retiring from farm management but staying on in the farmhouse was a solution for some of the families. And many of the interviewees had put a lot of effort
and resources into building comfortable homes and encouraged their children to develop their own homes elsewhere.

Probably farming, or at least parts of farming, was an 'end in itself' for virtually all the interviewees, yet there appeared to be considerable variation on what exactly makes a satisfying personal career. One interviewee raised questions about other farmers’ goals,

I’m just intrigued because you’re obviously getting around, and interviewing a cross section of farmers I assume, it would be interesting to see the responses of how many are actually really positive, or happy doing it because it’s a lifestyle, or doing it because they’re making money, or they can’t wait to get it out (Attribution MM).

Perhaps these reflections indicated that satisfaction in farming is important but not an easy subject for farmers to discuss with other farmers. Perhaps it gets harder as the End of career gets closer because the younger interviewees - just starting their careers- had no difficulty saying farming had an intrinsic appeal (but in their own words),

Yes, I have just been fascinated with it, so I stay on I suppose – just keen (Attribution MS).

The interviewees indicated that the End of career required a lot of thought and planning. This often started years before and influenced how people viewed opportunities. For instance,

We have some money now because … and it’s about idealism more so than the desperation of making the dollar. You become far more philosophical about it when you get older. So you tend to know that there are efficiencies which you just choose not to visit (Attribution MA).

Perhaps this indicates the degree of motivation satisfaction achieved so far, suggesting they don’t need more money to satisfy remaining motivations but rather something else, probably more time to spend on other interests. Sheldon et al. (2006) found from a study of parents and their college aged students that more often than not, people develop a greater sense of autonomy and psychological well-being as they age. It was clear for some interviewees that their Personal Career Path in farming was not a vehicle to deliver satisfaction on all their motivations. They needed to do other things, to have a different vehicle (occupation perhaps) in order to satisfy remaining motivations. Comments about this included,

I can’t see the point in farming until you’re 75, 80. I don’t think it’s worth while (Attribution MA).

Perhaps this shows the tensions with family obligations keeping the decision-makers working to keep the farm business profitable when they might be inclined to pursue more intrinsically interesting activities.

The End of career, like the other BOXES, does not stand in isolation of influences from any of the preceding BOXES, and being the last, all the other BOXES influence it. Social Obligations (BOX 5) and hence policy on older people is a particularly important influence on the End of career. Foskey (2005), in reviewing issues around aging and retirement in farming, captures the social pressure being applied to farmers to quit farming at the 'normal retirement age' in two sentences. "It is important to assist farmers to perceive a period of life without hands-on involvement in a farm business as a positive life choice, rather than something to be delayed as long as possible and only to be undertaken when forced by circumstances, such as deterioration in health" (p 105). Because, [the] "failure of many older farmers to exit farming, by what is generally regarded in policy as the appropriate age for retirement, has been perceived by agricultural commentators, politicians and those responsible for policy development as a substantial barrier to the establishment of a more efficient and sustainable Australian farm sector" (p 1).

A fuller understanding of the social pressure for retiring can be obtained by comparing different groups and industries. For example the social pressure on farmers to retire ought to be viewed against the social acceptability of urban people buying farms in peri-urban areas for 'life-style and retirement'. It could also be compared to the social pressure for operators and owners of other businesses to retire at an 'appropriate age' to facilitate the more efficient and sustainable use of resources in their sectors of the Australian economy.
3 Discussion

3.1 Summary of findings

The earlier Drivers of Land Use Change (DLUC) Project, on which this one built, developed five stories from in-depth interviews that represent the motivations of a farming family working their way through life. These stories for a hierarchy, the story at the top of the hierarch is referred to as the 'succession of family responsibilities'. The other stories contribute to this story and are 'overcoming isolation', 'enjoying farming', 'children's education', and 'learning about farming. Farming families seek to satisfy these motivations, at least in part, by practicing farming. The DLUC Project showed that farming families use at least three decision systems in operating a farm. These decision systems form a hierarchy with the 'family decision system' occupying the top of the hierarch, and one of the decisions that they take in this decision systems is 'lets go farming'. Once this decision is taken in the 'family decision system' it is then supported by the 'farm trading business decision system' and the 'farm ownership decision system'.

The current project (U-FDS) has shown from in-depth interviews that farmers endeavour to satisfy their own motivations and family motivations by using a life long and adaptive process we refer to as their Personal Career Path. Personal Career Paths are dynamic and how they develop depends on a huge number of events and happenings, many seem just random but during the interviews we noted that many of the influences on Personal Career Paths seemed to be derived from ongoing tensions that people felt during their lives. Taking action to do something about these tensions was clearly an important aspect of decision making. These tensions can be envisaged as a series of five Lenses through which farm decision-makers view, create and implement opportunities. The Lenses are, Intrinsic interest, Family considerations, Knowledge of personal components of opportunities, Social considerations and Knowledge of and access to external components of opportunities. The outcome of opportunities influences what the farmer can do next, so consequences of actions are important in advancing a Personal Career Path but consequences, or learning from these consequences, can also alter the direction of the Personal Career Path.

At any one time, farmers are limited by the Lenses they have in use. However over time the farmers can refine, develop and expand these Lenses. In terms of the personal components of strategic opportunities farmers can increase their knowledge, skill, enthusiasm, confidence, physical and financial resources and also their self-awareness. They can also improve their knowledge of and access to external components of opportunities such as credit, markets and sources of information. Contacts with other people are critical for establishing and developing the Personal Career Path and also for developing the Lenses.

When a farm is managed by a partnership (husband and wife, siblings, business partners etc.) what happens on the farm is a result of the interaction between two or more Personal Career Paths. Each person in the partnership views strategic opportunities through their own five Lenses. Hence they will see things somewhat differently.

Farmers see opportunities through these five Lenses, but the way in which policy and programs influenced these Lenses is described in this project in terms of seven BOXES of influence. Each of these BOXES is a point at which the decision systems of farmers are influenced by an external influence. These influences vary. Influences in early BOXES tend to be normative, such as education and experiences, while later ones tend to be mimetic, stemming from risk aversion, and coercive, such as regulations, incentives and markets (DiMaggio and Powell 1991).

The first of these BOXES relates to the intrinsic interests that people develop - probably very early on in life and included early education. The other six BOXES relate to influences that modify / enhance this intrinsic interest. Of these, three relate to the personal aspect of opportunities (BOXES 2, 3 and 4, later education and obligations to families) and the other two (BOXES 5 and 6) relate to the external aspect of opportunities (eg. social pressures, markets, finance or the weather). BOX 7, relates to 'post-retirement' but is significant because the prospect of retirement influences many decisions people make before retiring.

The overall impact of the influences within these BOXES on farmers' strategic decisions tends to decline from BOX 1 through to BOX 7 but the influences become more specific in later BOXES (5 and
Thus farmers' intrinsic interests, early experiences, education, parents and siblings (influences in BOXES 1, 2 and 3) have a greater impact overall on the strategic decisions farmers make and hence on their Personal Career Paths than the existence of external opportunities such as grants for conservation works or what they want to do in retirement (BOXES 6 and 7).

### 3.2 Long term significance of the findings

The approach developed in both DLUC and this subsequent project (U-FDS) provides a rigorous framework for understanding the strategic decisions farmers make, during their farming careers, from their personal point of view. This is the emic perspective of decision making as opposed to the etic, or objective, scientific perspective of farmers' decisions (Harris 1999). Both perspectives are useful for government agencies to know about but for different purposes.

The etic perspectives of farmers' actions, especially those relating to the technical and economic matters of running the farm trading business decision system are the principal focus of agricultural research scientists and agricultural economists. The etic focus allows the pursuit of science, technical and economic efficiency to occur. This information is also valuable to farmers when they want to apply scientific advances and increase the technical and economic efficiencies in their farming enterprises. Farmers do not always apply this information (even when they know about it) because they have a different perspective, the emic perspective, which focuses them on looking for components of opportunities that they can use to satisfy their family's motivations.

The DLUC Project has shown that a farming family's motivations focus on notions such as succession of family responsibility rather than notions of being in the forefront of science and efficiency. The difference between the emic and etic perspective may help explain different diffusion rates of innovations (Rogers 2003). "Innovators" and "Early adopters" may see an innovation as a useful component in creating the kinds of development that will deliver their family's motivations, whereas the "Laggards" may have the view that the innovation will not advance their family's motivations. The situation changes with each innovation. Thus their emic perspective guides both "Innovators" and "Laggards" whereas the etic view of the innovation, held by scientists or economists, is that the innovation would help everybody which implies that "Laggards" are behaving inappropriately.

Understanding the farmers' perspective of opportunities is probably helpful in virtually all interactions between government agencies and farmers. This may be so even when the interaction is indirect. Having a rigorous process to find out what this perspective is (as used in this study) is essential. It is not really possible to pick it up from casual conversation. The emic view of farmers may challenge the etic view of these opportunities held by government agencies. Instead of considering this as a nuisance and calling for farmers to change their attitudes, agencies might be able to use this information to find more appropriate opportunities to help farmers change their actions. Some of the principal values to government agencies for understanding farmers' emic perspective of opportunities are discussed in the sections below.

### Dealing with the life long context of decision making

A number of issues government agencies are involved with, such as NRM and resource use efficiency, have a long time frame and so involve strategic decision making on the part of farmers. The concept of a Personal Career Path and the mental model provides a logical framework for collecting evidence about the ingredients and purpose of farmers' strategic decision making in the context of their career paths. The framework could be used to provide a deeper understanding of research that focuses on farmers' business objectives and how they go about farming. For example, it would complement work such as that described by Pannell et al. (in press) by putting their research into the context of people's entire farming careers.

The framework provides a way of understanding the role of motivations in determining what kind of development farmers are aiming to achieve in the long-term for the benefit of their family members and how overall outcomes of farming are evaluated by families. The framework differentiates motivations from objectives by showing their hierarchical relationship. This relationship indicates that objectives serve as mechanisms to help farmers satisfy motivations. Thus motivations can be shown, from evidence collected from farmers, to put limits to otherwise open-ended objectives (such as wealth creation).
Understanding Farmer Decision Systems That Relate To Land Use

The framework also makes it clear that farmers are focused on developments that satisfy their family's motivations and that to support and advance these developments they create and take up opportunities that use a mix of components. This contrasts with the tendency of agencies to focus on the economic efficiency and environmental sustainability of the physical parts of these components (NRM issues such as water and land use). Further investigation of these different focuses and what they mean for the future could inform rural policy development by bringing sustainability issues into the same dialogue as farmers' development issues. The importance of understanding the relationships between sustainability and development issues for the future was highlighted in the late 1980's (WCED 1987).

At present, although there is information about physical and social changes there is little knowledge about whether these changes represents positive development for farmers and rural communities as a whole for the future. The framework provides a mechanism for collecting and evaluating evidence about how farmers (and other sectors of rural communities) view changes in terms of being positive or negative developments for their long-term future and for the future of following generations. This information would address the issues surrounding personal responsibility for inter generational equity (de-Shalit, 1995). While this may seem rather esoteric and far removed from current practical policy, it addresses issues of considerable significance to farmers as they and their descendants are central players and will, in the longer-term, greatly influence the effectiveness of resource efficiency and sustainability policies. Improving our understanding of what developments are being created and their consequences in the long-term are both important for policy but so is agreeing what it is that has to be sustained. It is interesting to note that a European proposition about a sustainable farm is that it be Economically Viable, Psychologically Livable, Ecologically Reproducible and Transmissible (allowing new generations to live on the farm) Oerlemans and Assouline (2004).

The framework helps to place the physical outcomes of a Personal Career Path, (the farm business, the resources used, the products or commodities produced, the infrastructure created, the landscapes created, and the wealth created), into the context of farmers' motivations. The framework thus links the trends in State-wide data with an understanding of the individual reasons that farmers have for taking the actions that collectively create these State-wide trends. The relationship between observable quantitative data, such as census information, or state of the environment reports, and the explanations of why individuals take the decisions that in sum constitute these trends, adds a level of understanding that makes both kinds of information (qualitative and quantitative) more useful. The State-wide quantitative data can be scientific, demographic or economic. For example, the framework provides a rigorous mechanism for collecting and analysing information to link social data (regional / state / national) (eg. Byron et al. 2004, Barr et al. 2005) with the components of the strategic decisions that farmers make. Knowledge created through the framework about what farmers are actually endeavouring to achieve over their farming careers would enable the trends identified in State-wide quantitative analyses to be understood in terms of farmers as the decision-makers. The knowledge would provide agencies with an insight about how they can help farmers make strategic decisions at the most appropriate times in their careers when they still have positive options available rather then relying on retirement as the change agent.

In this project, the concept of a Personal Career Path has been applied to NRM decisions but it could be applied to any other topic in rural affairs such health, education, risk or safety. It could also be applied to other occupations. This adaptability exists because the analysis uses a systems-thinking approach enabling other system to be described in terms of a career path. For instance, a farmer has a Personal Career Path that describes their relationship with farming, but the farmer may also be a politician for a time and his or her relationships with politics can also be described in terms of a Personal Career Path. For example one interviewee noted,

I’ve done, over the years, a reasonable amount of physical work on the farm and... for the last 20 years I have taught at the local school, and I have been a councillor on the local shire (Attribution FM).

A Personal Career Path does not have to be considered strictly in life-long terms, it can be applied to the time spent in a specific occupation.

Dealing with the dynamics of progress

Progress and change tend to have a random element. Change processes are not normally linear and not necessarily heading to some preordained destiny. However, farmers have stable motivations and in the long-term would tend to embrace the changes that they believe are going to satisfy these motivations. Thus understanding where farming families are endeavouring to go, helps to interpret the dynamics of
the progress. The emic approach to understanding farmers' decisions gives scope for understanding the
dynamics of how farmers create action by using personal and external components of opportunities and
how their decisions are influenced by changing family and social tensions and external forces.

The material produced in this project and previously in the DLUC Project is easier to understand if one
appreciates that the best way to view decisions is from the perspective of those people who taken the
decisions. In this case, the perspective is 'the farmer decision makers within the context of their
family'. This project has established a framework to deal with this level of complexity but the
framework allows for even more complexity to be included at a later date should further research be
undertaken. While simplicity is important for communication purposes it is also important not to make
mental models too simple and so relinquish reality and applicability.

The idea that the farmer progressively looks for opportunities through a series of Lenses (five in this
case) provides a way of dealing with the dynamics of their progression through life. Progress happens
when people learn to deal with the next event from the experience of earlier actions. Authors such as
Checkland and Holwell (1998) describe this as a dynamic learning process. One interviewee noted the
learning value in failing to take up opportunities,

And I think it is probably good to miss a couple of opportunities because it just sharpens
you up and you tend to look at the bigger picture rather than the smaller picture
(Attribution MM).

The concept of the Personal Career Path, as the thread linking the motivation theory and strategic
opportunities in our mental model, provides a practical base to understand what farmers are trying to
achieve with these dynamic processes. The idea of Lenses helps us envisage where the farmers are
accepting influences from, and why they select to be influenced by some things and not by others.
Learning provides a way for farmers to clean their Lenses, and the clearer the Lenses are, the greater
the range of options the farmer will be able to see. The more options they have, the more likely they
will be able to find a course of action that moves them a bit closer to satisfying their motivations. It
might help one interviewee, who noted that,

[wool growing] It's all I've done since high school.... It's all I know how to do
(Attribution MM).

The framework could therefore be made into a useful planning tool for farmers to use that would help
farmers understand the dynamics of the influences they face on a personal level. Farmers could
personalise the framework to identify what skills and resources they need to develop in order to
advance their unique career path in a ways that would help them satisfy their family's motivations. The
framework is a potential tool for guiding personal capacity building over an entire career. This
approach might be of particular interest to programs aimed at personal and social capacity building.

A clearer understanding of these Lenses by agency staff would facilitate the creation of programs to
influence the decisions that are made around them. But taking a policy perspective means we have to
take a different view of Lenses. We have called this view, BOXES (of influence). Knowing which
BOXES the program or policy is using to create an influence, gives the program developer a good idea
of the dynamics that is likely to follow. For instance, the dynamics that follow a $1,000 fencing grant
(Box 6 intervention) are quite different from the dynamics that follow a $1,000 travel grant to take
primary school children on a farm visit (BOX 1 intervention). The BOXES thus provide a
classification system for policy and programs that is meaningful in terms of their impact on influencing
farmers but they also provide a basis for gap analysis in policy and programs.

Knowing the aim of the program in terms of farmers' Personal Career Paths concept also allows the
program manager to institute an evaluation system that is based on total quality management (TQM)
principles (Deming 1986) even though the process is dynamic. This kind of evaluation is much more
likely to lead to creativity and progress towards influencing outcome on a career path than the open-
ended evaluation systems usually used by government agencies (eg. Roughley and Dart 2005).
Evaluation systems based on total quality management principles are much harder for senior
management to establish because they require precision in identifying long term objectives but they
have been proven in industry to be outstandingly successful over the last five decades. The Personal
Career Path concept would facilitate their use in rural social and NRM issues.
What future farmers might be creating
The concept of a Personal Career Path serves as a linking device within the mental model of decision making that ensures that researchers separate the emic perspective of the decisions made by farmers (Lenses) from the etic perspective (objective reasons) of these decisions. The emic perspective (the farmer's personal reasons) is all that matters in understanding why decisions were made. The etic perspective allows these decisions to be understood in terms of some other logic such as economics or science, but this does not help in understanding why decisions were taken.

If government agencies want to guide progress (such as land uses) without getting negative unforeseen outcomes there seems to be no alternative but to try and understand them from the farmers' perspective. Government agencies can influence change by using a range of interventions and might have a range of reasons for wanting to guide change. They might want to help farmers satisfy their motivations and establish arrangements to help future generations in the same way. They might want to change how farming is being conducted in order to improve the efficiency and sustainability of resource use in the national interest. In either case, knowing how farmers view and so react to a range of interventions is important not only to ensure the immediate objective is reached but also to ensure that interventions do not lead to unforeseen negative changes. These negatives could be the inability of farming family to gain satisfaction of their motivations or adverse consequences in the physical aspects of farming (land, water use and production). Thus understanding farmers' decision systems would help agencies create programs that, in addition to helping farmers satisfy their motivations, would assist farmers meet social obligations (such as environmentally sustainable resource use). Equity considerations would tend to indicate that helping farmers to satisfy their motivations is a legitimate policy objective of government agencies.

The knowledge gathered by applying the mental model and the concept of Personal Career Path helps create an appreciation of what future world of motivation satisfaction farmers are developing through the decisions they are making now as individuals. In trying to satisfy their motivations they may be creating a world in which similar motivations can be more easily satisfied in future. But this has not been researched and so it is not possible to know whether future rural communities will be better off in terms of motivation satisfaction than current generations. Many farmers doubt that future generations of farmers will be more able to satisfy their motivations than present farmers and this view, if shared by young people, might have a bearing on what actually happens.

There is ongoing research on the physical trends in agriculture and in rural communities including programs that deal with the impact of agricultural practices on the environment. However, it is not possible to link the finding about physical changes with what developments farmers are using their decision systems to achieve in the long-term, (the purpose of these development is motivation satisfaction), except in general ways. This is because development aspects of farming are in a separate category from the sustainability and efficiency aspects of farming. Perhaps, physical changes in rural areas could be thought of as surrogate measures of potential social influences on farmers; the bigger the negative changes to the environment and the bigger the inefficiencies in resource use, the bigger the social pressure for change. These social influences are more likely to be accepted by farmers in the long-term when they help farming families satisfy their motivations. This implies that understanding what developments farmers are creating on purpose and also what developments are emerging as a consequence of the myriad of individual decisions, might be crucial for finding ways of changing agricultural for the good of farmers, rural communities and the nation.

3.3 Using BOXES to match policy and programs with desired outcomes
There are already many existing policies and programs in all seven BOXES that have a profound influence on what farmers do. In addition the activities of commercial firms and business interests also influence what farmers do. The grouping of these influences into the BOXES within the framework of the mental model and Personal Career Path provides an improved understanding of these influences and the relationship between them. For example, programs that influence the early stages of Personal Career Paths (BOXES 1 and 2) have the greatest potential to change the strategic decisions farmers make during the course of their farming careers. (Remembering that there is usually more than one Personal Career Path involved in the management of a farm). In regard to strategic NRM decisions,
changes in these early BOXES sensitised the farmers to the issues so that in later stages of their careers they are more willing to act on new information to improve their NRM.

Programs and policies that create influences in BOXES 5, 6 and 7 are usually targeted to particular issues. Programs and policies in these BOXES that address NRM issues (such as regulations or incentive payments in BOX 6) generally have short-term impact on farmers' actions unless the farmers are already sensitised to NRM issues. Of course agencies implementing programs in BOX 6 might decide to add an education element (BOX 2) to the program to extend its influence (this is discussed further below).

In summary these BOXES are:

<table>
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<tr>
<th>BOX 1</th>
<th>BOX 2</th>
<th>BOX 3</th>
<th>BOX 4</th>
<th>BOX 5</th>
<th>BOX 6</th>
<th>BOX 7</th>
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<td>Obligations to parents'</td>
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The route for gaining the greatest influence on the Personal Career Paths of people about to enter farming or in their early years of farming is via the contacts that the farmers already recognise as being reliable. Three groups of contacts are important:

- those who advise individuals on their Personal Career Path, [career advisers]
- those who influence the development of farmers' skills, knowledge, confidence etc ie the personal components of opportunities, [educators] and
- those who control the availability of external components of opportunities [bankers, marketers].

Moving the 'social obligation' (including NRM) influence on the Personal Career Path, depicted as programs and policies in BOX 5 to the left by creating programs and policies that fit into BOXES 1 and 2 (early education and training) would result in NRM becoming better integrated into farmers' Personal Career Paths. Conversely, moving the 'social obligation' (including NRM, depicted as BOX 5) to the right into BOX 6, (markets & incentives) would result in NRM remaining an external component in farmers decision systems and so less integrated into the Personal Career Path. Moving the consideration of NRM into the right hand BOXES would be an effective short-term way of improving NRM and also an effective way of getting immediate action on specific issues.

In other words, moving the consideration of NRM into the left hand BOXES by addressing NRM through normative polices of education (eg. BOX 2), would be an effective long-term and general solution. Whereas moving the consideration of NRM into the right hand BOXES through policies that provided grants (eg. BOX 6) would be an effective and specific short-term solution.

Once the short-term solutions are implemented (grants of NRM work) and farmers accept the philosophy behind it (no NRM work without a grant), it would be difficult to drop the short-term solutions in favour of the long-term solutions. Fundamentally these are opposing (competitive) approaches. Despite this problem agencies tend to use short and long-term solutions concurrently. Three scenarios are possible:

- It may be possible to maintain the short-term solution indefinitely given adequate ongoing political support for these programs.
- It may also be possible to move NRM (BOX 5 social pressure) to the left (BOX 2 training and education) to ensure a long-term solution and concomitantly move NRM (BOX 5 social pressure) to the right (BOX 6 incentives and regulations) to gain a short-term improvement.

This sounds like a trick but two features might make this possible:

1. The policy instruments selected for the short-term improvement could include a sunset clause so that all farmers know that the programs are not going to be continued.
2. The markets for short-term and long-term programs are segregated. The segregation instrument could be age (as in pension schemes) or / and income level (as in taxation schemes). For example, all farmers could be eligible for the long-term programs but only farmers over the age of 60 with an income below $100,000 could be eligible for short-term programs (grants). In this way the short-term programs would automatically phase out in 20 years or so.

- Running short-term solutions (BOX 6 incentives) may create a mind-set in farmers that reduces the effectiveness of long-term solutions (BOX 2 training). Because of this mind set in farmers, agencies may think that the change from a short-term to a long-term solution is no longer their responsibility but rather rests with the farmers, its up to them to change their attitudes / mind sets. Possibly agencies may decide that this change will occur when a new generation of farmers with a different attitudes / mind set takes over. Perhaps when the current farmers (baby boomers) retire over the next 15 years and generation X or Y takes over.

However, if government agencies want to achieve something very specific like conserving a particular area, plant or animal species, then they need to legislate to create some specific programs in BOX 6 (external aspects of opportunities; market regulations, or conservation ordinance). This is because although programs in BOXES 1 and 2 are very influential over a lifetime, they create general trends not specific actions.

The conclusion is that policy and programs can and do stimulate increased farmers actions in NRM issues. These policies and programs can be divided into two categories:

- **Category One** includes programs that are aimed at overcoming deficiencies in the external components of opportunities (eg. by giving grants). These are useful for overcoming short-term and specific NRM issues. These programs can only work on a voluntary basis if farmers already have the relevant personal components of opportunities, such as an intrinsic interest in NRM, the basic knowledge to understand NRM, time to undertake the work, and the physical resources needed. These programs are unlikely to have any influence on changing farmers' Personal Career Paths but they would help those farmers who already have an interest in NRM progress their Personal Career Paths.

- **Category Two** includes programs that are aimed at altering the personal components of opportunities. They do this by helping farmers interpret their motivations in terms that require a longer term and more caring view of their obligations to family. These programs would work with all farmers and would be most effective during learning phases in Personal Career Paths that involve working with nature and working on people’s rights and responsibilities (BOXES 1, 2, 3 & 4). These programs would lead to changes in farmers' Personal Career Paths and therefore provide the basis for long-term solutions in NRM.

Programs that fit Category One (short-term solutions) may inhibit the effectiveness of programs that fit Category Two (long-term solutions). The short-term solutions seem to have priority in government agency action. Smithers and Furman (2003) noted that there were two dominant fronts on which jurisdictions around the world were responding to the environmental implications of the intensification of agricultural over the last two decades. One was fostering research geared to developing alternative farming technologies (best-practice technologies eg. the FBB Project) with the promotion of sustainable agriculture i.e. NRM (BOX 6). The other was the introduction of more direct forms of regulation of agriculture such as controls on clearing native vegetation (BOX 6). The process underlying these approaches is that experts develop solutions to identified problems and then program managers seek to affect the desired changes in farmer attitudes and behaviour leading to the adoption of specific innovations, either by extension or by regulation.

Stoate et al. (2001), writing about Europe, noted that increasing arable intensification has accelerated environmental problems and that the impacts are greater for society as a whole than for the farms on which they operate. This is probably true in Australia too. The long-term solution for issues that are spread widely across society may not be found in mechanisms that influence farmers directly (in BOX 6) but might include the more dispersed influences that exert their effects through programs in all seven BOXES.

An alternative approach is for farmers themselves to initiate 'grass roots' programs and so they themselves become the investigator and final authority. However, this requires that sufficient farmers
have an intrinsic interest in NRM or native biodiversity conservation (BOX 1) to run these projects. While intrinsic interest cannot be instilled (by definition), government agencies could take a longer view and provide more programs to facilitate learning about NRM at primary, secondary and tertiary level education (policies aimed at BOXES 1 & 2). They may also provide these components for all farmers through more conventional extension or public advertising programs.

3.4 Suggestions for further Studies

The project's terms of reference do not ask for suggestions for further work. However, providing these suggestions is a way of pointing out the limitations of this small project and how these limitations might be overcome.

Improving the Current Framework

The DLUC and the U-FDS studies have been small-scale projects. A larger study would refine the framework and its parts (eg. the mental model and the motivational and opportunity theories) and lead to a better understanding of the processes used by farmers in making decisions. It may be useful to study decision process of farmers in different geographic areas (remote and peri-urban) and different groups of farmers (professional farm managers, families that are wholly supported by a farm business, and farming families that are only partly supported by a farm business). It could also be used to study the decision processes of organisations involved in a 'community of interest' including parts of a supply chain such as agribusinesses, farmers, and agencies.

Summary:

Apply the Mental Model and its components such as the Personal Career Path concept to other areas and with other groups of farmers and stakeholders in order to understand the decision-makers perspectives and to refine the model so it can be used with greater confidence in policy development research. Understanding decisions from the perspective of the decision-maker is important for organisations wanting to influence these decisions.

Linking family Motivations and Business Objectives

The specific links between the objectives that farmer set for their businesses, and their family's motivations, would provide a clear indication of the limits that are set by motivations to improving production levels, resource efficiency and environmental sustainability. This information is relevant because virtually all farms are family run or run for the benefit of families and therefore decisions are based on many considerations, not just on business principles. This work would help to clarify the nature and the extent of the contribution of the farm business to the farming family's ability to satisfy their motivation and what other arrangements (such as rural community services) are contributing to motivation satisfaction. This would seem to be a useful way of researching the relationship between farming families and the various communities that they are involved with (including geographic communities, such as towns).

Summary:

Improve our understanding of how farmers link motivations with farm business objectives in order to determine the limits imposed on farming by family motivations. This is important since most farms are family run.

The Developments that Satisfy Motivations, A Two Stage Study

In working towards satisfying their motivations, farmers create developments. These developments contain tangible and intangible parts. The process of creating these developments alters the environment (social and physical) so that in future creating new developments that help satisfy motivations may be easier or harder to create. Developments can be created on purpose but very often they emerge inadvertently as properties of the operation of complex systems. The systems include the interaction of farmers with their suppliers and agribusinesses (ie agricultural supply chains) as well as other systems that impact rural issues, such as education, commercial and social systems. The proposed first stage of the study would identify what development farmers are actually creating and how they might be altering future options.

Once developments are characterised, the role of government agencies in these developments could be identified to find out what specifically agencies are contributing. The work has the potential to show what kinds of development help farming families satisfy their motivations without any loss of the
Understanding Farmer Decision Systems That Relate To Land Use

physical and economic benefits that currently flow to society from agriculture. Evidence from even a casual inspection of rural areas or a review of the literature on rural affairs suggests that these long-term developments are not currently delivering high levels of efficiency and sustainability in the use of natural resources.

Summary:
Investigate the fit between the developments that farmers are creating to satisfy their motivations and long-term improvements in resource use efficiency and sustainability. This is important since these developments will probably not facilitate long-term improvements in efficiency and sustainability of resource use.

Linking the Mental Model to Quantitative Trends
Quantitative trends in physical, demographic and economic data can be linked to the individual decisions that farmers take to satisfy their motivations by applying the mental model developed in this project. Studying this link would add a deeper layer of understanding to the trends in the data by identifying the components of individual decisions that contribute to the trends (i.e. why farmers take the decisions that create measurable trends). Also the trend data would help to identify the components of individual decisions that are significant at a larger scale (State or National scale).

Summary:
Provide evidence-based explanations for the trends in some State-wide rural physical, demographic and social data in order understand the developments that are generating these changes and to create a more complete basis for policy and programs. A number of agencies would benefit from knowing why farmers take the decisions that lead to these trends happening.

The Mental Model, the Career Path and Capacity Building
The mental model and especially the Personal Career Path concept can provide a basis for helping individual farmers understand their own need for capacity building in the various decision systems they run. As a framework, the model provides a logical process enabling farmers to identify their family's motivations, the objectives they might have as intermediate steps, and what personal components (such as knowledge, skill and contacts) they need to improve to allow them to achieve the developments that will satisfy their motivations. The mental model could be converted into a capacity building frame for specific decision-systems and tested with farmers in a variety of different situations.

Summary:
Provide farming families with a framework to encourage effective career planning. The mental model and the career path concept could be developed into a framework to help individual farmers develop a personal life-long program of capacity building that would directly help them satisfy their family's motivations. A number of agencies, including training and education organisations, would benefit from having a farming community more able to articulate their educational needs and more able to identify the long-term development that would support families in Rural Australia.

Helping Farming Families Satisfy their Motivations
Having a social, technical and physical environment that allows people to satisfy their motivations in life (such as the five motivational stories) could be important for human development. While this is still futuristic thinking, farming families may have some disadvantages compared to families living in towns and cities. For example, Kilpatrick et al. (1999) note that it is well documented that Australian farmers have a lower level of formal educational qualifications than those of the Australian workforce as a whole and lower than agricultural workers in other countries (presumably OECD countries). Yet the motivation theory developed from farmer interviews in the DLUC suggests that farmers are strongly motivated towards children's education and also learning about farming. This apparent anomaly suggests further policy questions for investigation. Perhaps the most obvious concerns the adequacy of existing educational opportunities for families living in rural areas, including farming families. Are they available to farming families and are they suitable? The social, technical and physical environment also influences the isolation issues and enjoyment that farming families are able to obtain from rural living. The mental model and the Personal Career Path concept provide a framework for investigating these specific issues and identifying the role that various stakeholder play.
Summary:
*Improve understanding of specific issues within the context of a fuller understanding of the farming family. The mental model could be applied to investigate specific motivations that farming families have. It could be used to investigate how to improve the education of farming families by considering the suitability and availability of educational opportunities for farming families. It could also be used to investigate the attributes of enjoyment and isolation in rural living.*

In addition the mental model could be used to investigate a range of co-dependency situations between the roles people perform, such as co-dependency between farming families and their rural community, and farming families and stakeholders in agricultural supply chains:

**Farming families and Rural Communities**

In all likelihood family motivations cannot be satisfied purely from working in a farming business. There is evidence that members of farming families have many other interests, some of which fall into the category of a career path. Some of the alternative careers may be lucrative but others may provide non-monetary rewards. Very often these alternative careers greatly help rural communities to prosper which in turn can benefit all families involved. This might be the case even when farming families make up a very small proportion of rural communities. The mental model, especially the concept of a Personal Career Path, provides a way of studying the relationship between farmers and their rural communities.

**Summary:**
The mental model would provide a suitable framework for investigating the contribution that farmers (and their alternative careers) make to rural communities and vice versa.

**The Farm Business and the Stakeholders in the Agricultural Supply Chains**

The mental model could be applied using qualitative survey techniques to current issues of concern in rural industries, such as increasing the economic value of resource use, and NRM - sustainability issues. The objective would be to understand the decision systems of farmers in regard to these specific issues and how these relate to the decision systems that other stakeholders in the supply chain use. The value of the work would come from comparing the differences between the decision systems in order to find common ground between stakeholder groups and farmers where cooperation would be mutually beneficial.

**Summary:**
The mental model could be applied to a range of current issues in the supply chain to determine how farmers' decision systems relate to those used by other stakeholders in order to find common ground between stakeholder groups and farmers where cooperation would be mutually beneficial.

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1 Co-dependency refers to the situation in which an individual or a family depends on other individuals or families that in turn depend on them. It is more that just cooperation between people, as it implies mutual dependency. In most cases co-dependency has a beneficial connotation although it can be used to imply that people are 'too dependent' on others and so cannot achieve a healthy degree of autonomy.
4 Recommendations about how to modify and promote findings from the Farm Business & Biodiversity Project

4.1 Aim
Part of the purpose of this project was to

- To produce a report about farmer decision systems, focusing on opportunities, with useful recommendations about how to modify and promote findings from the Farm Business & Biodiversity Project

The Farm Business and Biodiversity (FBB) Project involved a study based on 17 sheep-beef farms in Victorian hill country. Nine of these farms were included in the project that was funded through the Land Water & Wool Native Vegetation and Biodiversity Sub-program (a joint initiative of Australian Wool Innovations and Land & Water Australia). Another eight farms were included in a second related project that was funded through the Native Vegetation R&D Program of Land & Water Australia. Information about vegetation, agronomic potential and farm business situation was collected. Analysis of this data has informed the identification of four strategies that can potentially deliver, each alone or in combination, the environmental gains required at a landscape level without adversely affecting profitability. Thus the purpose of the analysis is to identify if there are profitable solutions that achieve both business and environmental goals (Crosthwaite et al. 2006). Results of implementing these strategies on a representative farm were reported by Moll et al. (2005).

The findings from the FBB Project have been shown to be best-practice technology on a number of farms and have already been promoted through a six-month communication program. This has involved field days, a media field day with the launch of a brochure and complementary dog collars and three Extension Notes and dinners. Information about the four strategies will also be available on DPI and DSE Websites.

The U-FDS Project has made five recommendations about promoting the findings of the FBB Project. The first two recommendations support the communication program that has already been used in the FBB Project. The other recommendations are largely beyond the immediate scope of the FBB Project including recommendation 5, which suggests an educational program to stimulate a long-term interest in native vegetation conservation. These recommendations are included to show how the concepts developed in the U-FDS Project could be applied to promoting the findings of best-practice projects such as the FBB Project.

The four strategies investigated in the FBB project were:

- Targeted Native Vegetation Management and Correcting Nutrient Deficiencies elsewhere
- Targeted Native Vegetation Management and Intensive Rotational Grazing elsewhere
- Deferred Grazing on hill country
- Establishing Shelter Trees through natural regeneration

Fifteen of the 17 farms had at least one profitable farm change investment option that advanced both farmer and environmental goals indicating that farm re-organisational strategies exist that are compatible with both economic and environmental goals. The findings of the project are set out below.

1 Deferred grazing of hill country over summer months can improve stocking rates and profits as well as reduce bare hills over summer.

2 Whole farm planning can allow farm profits and native vegetation management to be improved on different parts of the farm at the same time by either:
   2.1 correcting soil nutrient deficiencies on the most productive paddocks, or
   2.2 intensive rotational grazing on the most productive areas of the farm, allowing other more marginal parts of the farm to be managed for native vegetation.

3 Establishing stock shelter through natural regeneration is relatively cheap and can increase farm profits in the long run.
4.2 Applying the findings of the U-FDS Project to the four strategies of the FBB Project

Although the policy maker, program manager and extension officer in government agencies may focus on the physical outcome of getting farms with this hill land to take up one or more of these reorganisation strategies, the farmers may take a different perspective. Since these four strategies are long-term investments, farmers may want to look beyond the immediate outcome to whether implementing these strategies help them gain satisfaction on their Personal Career Paths. Crosthwaite et al. (2006) note that many wool-producing properties are managed by elderly farmers and that consequently there will be a change in management within 20 years or so, when the investment cycle will be renewed. We could anticipate that increased investment would require a concomitant increase in returns and so an increased interest in the profitability of the four strategies. However there is no guarantee that younger farmers will be more interested in using these particular strategies that increase returns than the current retiring cohort of farmers. So there seems to be a lot at stake in increasing this interest and getting farmers to view NRM as important work that will advance their Personal Career Paths and help them deliver their family’s motivations. Perhaps then we can ask the question: “Why would farmers see any of these four strategies as helping to create suitable and available opportunities to advance their Personal Career Paths?”

The first step in addressing this question is to consider what these four strategies deliver physically then see how they relate to the BOXES in a Personal Career Path.

1 Deferred grazing improves native grass cover on the hills in summer. This would help reduce erosion and facilitate grass growth and hence stocks feed after an autumn break and so increase stock carrying capacity and profitability. The negative aspect is that the sheep are not grazing the hill so have to be fed during the summer. So the strategy is delivering increased profit, soil conservation, some nature conservation benefit and aesthetics (grassy as opposed to bare hills).

Farmers who have an intrinsic interest in native grasses and farmers who want to increase carrying capacity might consider this strategy an opportunity. These farmers are identified in BOX 1 (intrinsic interest) and in BOX 4 (family obligations). Farmers who have learnt about soil erosion and want to reduce soil erosion on their hills may also consider it an opportunity. These people are identified in BOX 2 (they are swayed by their education on erosion). There is a possibility that other farmers might consider deferred grazing an opportunity if they thought that well grassed hills or native woodland would improve landscape values. Good landscape values may increase the sale price of land (BOX 4 and BOX 7 the farm as part of their superannuation scheme). Farmers might be attracted to this strategy if using native grasses increased profits as this would help in meeting their obligations to family (BOXES 3 and 4). However some farmers are sceptical of the
commercial value of native grasses, for example one interviewee talking about their own pastures noted that,

*No they’re all improved pastures, rye grasses and clovers and things like that. You can’t do it with natives* (Attribution MM).

Farmers might be encouraged to take up this strategy by social pressure (BOX 5) or by regulations or incentives established in BOX 6.

2 Whole farm plan (soils improvement and rotational grazing) could lead to the farmland being used more productively.

Interest in developing and implementing a whole farm plan would come from BOX 2 (education on farming and land productivity) from BOX 4 (obligations to provide for their own family, and this requires agricultural production). It would also come from BOX 7 (good layout that allows the productive potential of the farm to be increased which could result in a higher value when the farm is sold or higher rent when it is leased and so create a better superannuation scheme). Whether or not whole farm planning is seen by the farmers as an opportunity to use native grasses in their grazing systems depends on the farmer having an intrinsic interest (BOX 1) in native grasslands and / or whether they are aware that native grasses can increase profitability (BOX 3). It may also depend on what social pressure (BOX 5) to conserve native grassland is felt by farmers and also on the existence of any regulations and / or incentives (BOX 6) that force or encourage native vegetation conservation objectives in whole farm plans.

3 Shelter-belts of native vegetation could improve conditions for sheep during weather extremes, improve the landscape and hence may improve land values.

Interest in establishing shelter belts of native vegetation would come from an intrinsic interest in native vegetation, especially in trees or in landscape or in the health of stock (BOX 1). For instance one interviewee started planting trees to improve the health of stock,

*we had two or three paddocks which had shelter in one corner of them but if the sheep got blown out or up the wrong end of the paddock there was no shelter and then they’d sort of start to huddle in a corner. We had to be aware of that if they were freshly shorn or whatever because they were likely to either smother or die of exposure. I just started growing a few trees to put a little bit of shelter in these bare spots….It sort of becomes infectious so in addition to planting trees for windbreaks [we planted trees in] areas where we’ve had rock or where we can’t cultivate ….We’ve planted a fair few trees to help with salinity control and stuff like that* (Attribution MM).

Farmers might also plant trees because of social pressure (BOX 5) or as a consequence of regulations or incentives (BOX 6). Farmers who want to increase the long-term value of their land (BOX 7 for retirement) and believe that the trees in the landscape improve its resale would tend to see shelter-belts as an opportunity to take up.

4.3 Overarching comments and recommendations

Overall the planning and productivity aspects of these four strategies coincide with the farmers' obligations to their families (BOX 4) to provide an income quite apart from nature conservation. Farmers are aware that to make the best use of their farmland they ought to manage it in accordance to its capabilities. The procedure used is 'whole farm planning' which among other things allows land to be used in such a way that its contribution to the farm business is improved ('maximised'). Farmers are likely to plan their farms irrespective of their interest in native vegetation. Farmers already pay a lot of attention to labour productivity and the increasing relative cost of land will increase their interest in land productivity. This includes improving and applying new farming systems that increase productivity in terms of area. Increasing soil fertility saves capital expenditure as it substitutes for land purchase. For example, a 10% increase in land productivity on 1,000 hectares is equivalent to a land purchase of 100 hectares (currently between $150,000 and $250,000 in the Ararat area). Farming systems that use land more productively could include rotational grazing systems and feed lot systems. It is possible that these farming systems might be organised in a way to increase the use of native grassland.
This suggests that different farmers would view the four strategies for conserving native grasslands somewhat differently. Some farmers might see these strategies as opportunities to take up because they have an intrinsic interest in native vegetation (BOX 1) or because they believe them to be more profitable than alternatives (a higher net present value) (BOX 4). However other farmers might be extremely unlikely to take any action unless forced to.

An important finding from this project is that contacts are extremely important in helping farmers in their Personal Career Paths. Where people are uncertain of things they seek information from a wide range of people but with a preference for people they think are credible in regard to the information they seek. So in making the recommendations that follow we have emphasised the need to use contacts that are likely to have the greatest credibility in regard to the content of the information. There is some support for this approach in work by Kilpatrick et al. (1999) on how farmers learn about marketing and management. For example, they recommend that experts such as accountants whom farmers would normally contact about management issues should be informed about management training programs so they can advice their farming clients on management training. "Experts are the preferred learning source for management and marketing for many farmers. They are in a position to promote suitable activities to farmers at a time when the farmers are contemplating changes to their practices, and when the farmers are most likely to see some relevance in the training activities" (Kilpatrick et al. 1999 p xvii). The point is that farmers appreciate that the expertise people have is limited so it is very unlikely that farmers would seek the advice of an accountant on how to build nest boxes, or act on financial advice from a conservationist.

Farmers are likely to be more interested in the four strategies if they learn about them from sources they feel are credible considering the content of the strategies. Farmers with an intrinsic interest in using native grasses in their production systems may find sources recognised for their environmental knowledge most credible. In contrast, farmers who are most interested in the profitability of grazing might find sources recognised for their business and agronomic expertise most credible. Using both kinds of sources (environmental and business) might maximise the likely take up of these strategies. The following recommendations are based on the assumption of 'credibility' of sources and on the concept of BOXES.
For results in the short and medium term, five recommendations flow from analysing these four strategies in terms of the seven BOXES.

1 Conservation information via credible contacts:
This recommendation is targeted at farmers who already have an intrinsic interest in nature conservation (BOX 1). Where farmers already have an intrinsic interest in nature, the government agency only needs to supply information about the strategies, how to do them, where to see them in operation, how much they cost and so on. So long as the government agency is credible, the farmers will implement the strategies as and when their resources permit. The agency might produce a coloured brochure (video etc.) with information and contact details and circulate this to the kinds of organisations, groups and networks that provide credible contacts for conservation orientated farmers. If there is a credibility problem because of the source of the material then the agency may need to seek endorsement of the strategies from a credible organisation and promote the strategies jointly or let the conservation organisation take over their promotion and further development. Being able to contact the farmers who are implementing these strategies and visit their farms would help farmers deal with the risks involved over the period of implementation (this is a mimetic solution). Having this network of farmers available would allow farmers, who are still considering whether or not to adopt the strategies, an ongoing source of information and technical support. Parminter (2006), in talking about farmers adopting environmental programs in New Zealand noted that, "Landowners appear to put a high weight upon the source of the information that they are provided with and prefer their information to be supplied by acknowledged technical experts and farming peers". Delivery of conservation information via technical experts in production will not necessarily overcome a credibility gap.

Recommendation 1: Produce information that emphasises the conservation aspects of the project's findings and distribute this via contacts that are accepted by farmers as being reliable
This information would help overcome a deficiency in the external components of opportunities (BOX 6) and would be especially useful to farmers who already have skills and a desire to conserve native vegetation in their production systems. The project is already doing this. The emphasis in the communication messages of the FBB Project is both production and conservation advantages.

2 Economic information via business contacts:
This recommendation is targeted to farmers who don’t have an intrinsic interest in conserving grassland but want to fulfil their obligations to their own families (part of BOX 4, and part of BOX 7). These farmers might consider these strategies as opportunities to meet their obligations to their own family if they thought that the strategies had utility value, either for increasing income or for increasing the sale or lease value of their land. They would be interested if native vegetation conservation increased the immediate profitability of the grazing enterprises on the farm (perhaps improved feed for sheep) or increased land values, via reduced erosion, improved landscape and aesthetics, or improved conservation status. To get these strategies implemented on this basis the agency would have to ensure strategies reached farmers through the contacts and training processes that the farmers equate with credible advice on land values and profitability of farming. As with the previous case, the farmers need to be able to see these strategies in place on a farm and actually delivering the profits and land values that they are heralded to achieve.

Recommendation 2: Produce information that emphasises the financial aspects of the project's findings and distribute this via contacts that are accepted by farmers as being reliable
This material would help overcome a deficiency in the external components of opportunities (BOX 6) and would be especially useful to farmers who already have the skills, resources and a desire to invest in systems that will increase their financial returns. The project is already taking this approach. The emphasis in communication messages is both production and conservation advantages.

3 Changing conservation priorities via conservation contacts:
Farmers might implement these strategies if there were sufficient social pressure to do so (BOX 5). The greater the 'cost' to the farmer of implementing these strategies in physical and psychological terms the greater the social pressure would have to be. However, improved native vegetation is a change that is not easily visible to the general public and some improvement might be quite cryptic
requiring a quadrat survey by an expert to be appreciated. Therefore the pressure coming from social disapproval or approval might be quite small. Instead of expecting social pressure to come from the general public the agencies could focus on conservation groups and provide training in grassland ecology. The social pressure might be more effective if the agencies used specialist conservation groups for the farmer contacts and got these groups to focus on farmers who are already conservationists. The purpose of this social pressure would be to get conservation orientated farmers to change their conservation priorities to grassland conservation. The danger in this approach is that some conservation farmers might be put off conservation action entirely if they get mixed messages (eg. wetland conservation no longer matters).

Recommendation 3: Use conservation organisations to encourage farmers to give priority to grassland conservation

Setting a conservation priority would help to overcome a deficiency in information in the external components of opportunities (BOX 6) and would only be useful to farmers who already have an intrinsic interest in native vegetation. In this case contacts with conservation groups who have the skills, resources and desire to conserve native grassland over other natural ecosystems would be required. This recommendation is included for completeness. It highlight the point that conservation priorities can vary between areas and native grasses may be more important in one areas than in the next and that providing specific local information on priorities is a useful service for farmers and other landholders.

4 Regulation and incentives via government agencies

The government agency could regulate to force farmers to take up these options or provide incentives to encourage farmers to adopt these strategies (BOX 6). The effectiveness of these approaches would depend on how much money the agency put into the project to be used either for incentive payments or to police regulations. However there is a down side to these approaches since they give the on-ground work a utilitarian base (avoiding the penalties of non-compliance or getting the financial incentives). This implies that the on-ground work is likely to stop when the value of carrying out these strategies declines. This will occur if fines are not imposed to back the regulations or when the financial incentives stop (money payments or tax breaks).

Recommendation 4: Create regulations and / or provide financial incentives for farmers to maintain grasslands

Regulations and incentives alter the external components of opportunities (BOX 6). While regulation would apply to all farmers, the amount of enforcement necessary would vary depending on what personal components the farmers already have. The fewer the personal components the more expensive the regulations would be to comply with and therefore enforce. Incentives would be relevant only in so far as they compensate for deficiencies in the components of the opportunity; the larger the incentive the more opportunities would become viable for farmers. This is clearly beyond the scope of the FBB Project, although it is understood that a new pilot project is being developed that will test the provision of incentives directed at farm level change (Crosthwaite, Personal communication).

5 Developing an early interest in native grassland conservation via learning organisations:

Although people may develop an intrinsic interest in nature, an interest in a specific ecosystem, such as grassland, is only likely to develop if information is presented to people from a trusted source. Developing this interest might be achieved in formal education or via some other arrangement such as conservation groups or nature clubs. This related to BOXES 1 and 2. The interest of older people can be awakened by including grassland conservation in tertiary programs and in adult learning programs (BOX 2). Course material and the endorsement of this material by the course providers is required.

Recommendation 5: Develop programs to stimulate an interest in native vegetation conservation via recognised learning organisations such as school, colleges and clubs.

Establishing programs to stimulate conservation interest (BOX 2) would change the personal components of opportunities. Because this interest may be stimulated early in a person's life it may take a long time to achieve results in the field. This is clearly beyond the scope of this project; the dog collar brochure may have addressed this in a very small way, as the animal motif is likely to appeal to children.
4.4 Points to be considered when undertaking projects similar the FBB Project

A great deal of research, including the FBB Project, produces information that is intended to influence how farmers run their farms. This might be scientific information, management, business-systems and marketing information, information on buildings, equipment and machinery or information on health, environmental protection and safety. The intended purpose of this information may include increased farm productivity (in terms of labour or resources), profitability, efficiency or sustainability of resource use. It could also be directed towards some other aspect of rural life that has national importance such as poverty, health and safety, bio-security, structural-adjustment, environmental protection or adaptation to climate change. The adoption success of all this research depends on how well it related to the Personal Career Paths of farmers.

Although understanding and being able to relate research to farmers’ Motivations and Personal Career Paths is the common dominator for all these research projects, it not a central theme of research programs and so has avoided investigation. In addition, understanding Motivations and Personal Career Paths and the family context in which they are played out is conceptually challenging work as the DLUC and U-FDS Projects have demonstrated.

The following inferences are listed as points for discussion. They are proposed tentatively, and need to be tested further through empirical study before being accepted as valid.

- Projects like the Farm Business and Biodiversity (FFB) Project that create new opportunities to change technical management of farms have limited prospects of success if they do not relate well to the Personal Career Path of farmers.

- Having a significant influence on Personal Career Paths is beyond the scope of projects like the FFB Project, because the trajectories of Personal Career Paths are largely determined early in the farmer’s life – during education and early career.

- It is unrealistic to expect that single projects like FFB will achieve dramatic changes because they provide new information as an additional component for certain kinds of opportunities within existing farming systems.

- Projects like FFB that emphasise strategies that incorporate farm business success at the same time as environmental gain are likely to interest a range of farmers because they relate to Personal Career Paths in more than one way. They would be of interest to farmers wanting business success and to farmers with an interest in conservation and environmental issues.

- Credible contacts are important, but as farmers seem to compartmentalise decisions by whether they relate primarily to family, farm business or land ownership, it should not be taken for granted that conservation messages delivered by production-orientated contacts will be well-accepted.

- Even short-term projects like the FFB Project can include educational material on NRM (BOX 1) without compromising their overall purpose.

- The concept of Personal Career Path is relevant for all farmers even if they enter wool-growing late in life or only participate for a few years in wool-growing because the concept recognises that individuals can have Personal Career Paths in other industries and can run careers in different areas simultaneously. The concepts of motivations, decision systems, personal and external components of opportunities etc still apply and provide a way of understanding the influences on farmers, whatever their age.

- Projects like the FBB can increase the effectiveness of their communication strategies by thoroughly investigation the match between the kind of information they are developing and the information distribution channels they intend to use to ensure that credibility in the eyes of the intended recipients is maintained.

- Ultimately whether farmers take up the recommendations from projects like FBB will depend on whether farmers see these recommendations as allowing them to create opportunities that are suitable for them in regard to their family motivations and available to them by completing the necessary personal and external components of opportunities.
5 Overview of Project

The project has built on the systems-thinking approach and motivation theory developed in the DLUC Project by showing that farmers view opportunities through a series of Lenses that reflect the tensions they feel in developing their Personal Career Paths. The influence that policies and programs have on Farmers' strategic decision making, comes via the impact they exert on Lenses and thus on the ability of farmers to satisfy their families' motivations through their chosen Personal Career Paths. The project grouped policies and programs into seven BOXES of influence according to the nature of their potential impact on Lenses. The project helps policy makers and program developers appreciate the range of ways they can influence farmers' strategic decisions by targeting different BOXES of influence, acknowledging that different objectives would require programs in different BOXES.

The project's empirical approach and concepts provide a rigorous framework for understanding the relationship between policies and programs and farmers' strategic decision making processes. This highlights the further need to understand the overall developments that are emerging from individual decisions in the operation of agricultural supply chains as these developments may not be helping future farming families satisfy their motivations nor improve the efficiency and sustainability of resource use.
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Appendix 1. Terms of Reference

RMIT project - understanding farmer decision systems that relate to land use

Purpose of the project
- To produce a report about farmer decision systems, focusing on opportunities, with useful recommendations about how to modify and promote findings from the Farm Business & Biodiversity project
- To advance knowledge about farmer decision systems, extending the work conducted for the Drivers of Land Use Change Project

Background
This research project builds on previous research conducted for the Drivers of Land Use Change (DLUC) Project into farmer decision systems. That project developed a ‘drivers model’ that has two elements to farmer decisions - motivations on the one hand, and available and suitable opportunities on the other. The DLUC Project explored motivations in depth. This project will address the opportunities, while also testing previous findings about motivations.

The research is to meet the needs of the Farm Business & Biodiversity (FBB) Project for information about how its findings are likely to be taken up by farmers, and guidance on how to modify and promote those findings. This project involved studies of 17 farmers in five locations – Ararat, Maryborough, Broadford, Springhurst and Violet Town.

It is proposed that this research should involve farmers between Ararat and Beaufort. If realistic, it could also include farmers from the Broadford area.

There may be synergies, and potential for extending the research, if it can be linked to other programs. These include:
- The RMIT ‘change and continuity in peri urban Australia project’
- The Multiple Outcomes Projects initiated by Landcare and Sustainable Landscapes branch in DSE. Six of these have been established, with many more planned. One is in the Ararat area, and is co-ordinated by Louise Thomas (DPI) who has a close involvement with the FBB Project.

These linkages should not be established at the expense of meeting the core needs of the FBB Project.

The research should ideally include lifestyle property owners, because of their growing role in land management in many areas. This group are of much interest to various DSE programs and to the Victorian Catchment Management Council. However, including them may be unrealistic given the budget. Further interviews with lifestyle property owners certainly could be proposed as an extension of the approach.

Products of the Project
Three products are envisaged
- A final report
- A communication report in plain language suitable for extension officers and catchment management officers.
- A draft for a published peer reviewed journal paper

Milestones
RMIT Ethics committee approval 15 November 2005
Interviews completed 31 December 2005
Draft final report completed 28 February 2006
Draft communication report completed 17 March
Draft peer reviewed journal paper completed 30 April
Final report completed 30 April
Final communication report completed 30 April.
Budget
DSE will transfer $20,000 to RMIT University to cover salary, employment overheads and travel expenses for Dr Quentin Farmar-Bowers.

DSE will separately pay for the transcribing of the interviews currently estimated to be $3,000.

Roles and Responsibilities
Dr Quentin Farmar-Bowers will undertake the research. This includes conducting interviews, analysing the transcripts, and preparing the draft final report and draft the communication report. He will also cooperate with Dr Ruth Lane in preparing the final report and final communication report and co-author the peer reviewed paper.

Dr Ruth Lane will provide supervision, advice, and assistance during the research and cooperate in the preparation of the final report and final communication report and co-author the peer reviewed paper. She will also liaise with Dr Jim Crosthwaite on regular basis.

Dr Jim Crosthwaite will help organise the farm interviews and also help arrange the workshop with CMA and extension officers. The workshop is required in the preparation of the communication report. He will provide feedback, including editorial comments, on the draft reports so they can be finalised by the 30 April.

Other officers in DSE, DPI and CMA
Regional officer, such as Louise Thomas in DPI Ararat will be asked to help set up a series of farmer interviews. Between 12 and 15 interviews are proposed. Jim Moll will be asked to help with the running of the workshop in late February early March 2006.
Appendix 2. Question Guide

Question Guide
"Understanding Farmer Decision Systems That Relate To Land Use" Project

1 BACKGROUND
The project builds on earlier work that developed a model about long-term decision-making in farming families. The model required information from farming families on their long-term motivations and about how they handled opportunities in rural living and farming to satisfy their long-term motivations (aspirations). Interviews were conducted with families with farms in the Honeysuckle Creek area (Near Violet Town) and the analysis yielded a set of five hierarchical stories that represent the long-term motivations of farming families. These five stories are as follows.

1 Succession of family responsibility (families want to bring up their children so that they have the ability to act as responsible adults and take responsibility for their own family)

2 Educating children (this can become a principal or controlling activity for the family and last 20 + years. Education is more that just schooling and included recreation, arts and sports)

3 Learning about farming (people taking up farming have to acquire skills and knowledge in a wide range of areas, including technical aspects of farming such as the ecology of agricultural systems, machinery and livestock husbandry. They also need to master business principles and develop the skills of independent business people - usually sole traders)

4 Overcoming isolation (Although every person or family has to overcome a degree of isolation farming families who live on the farms have an added set of isolation issues to overcome. These are often based on distance and the time or cost issue of travel but include things like poorer quality facilities and less choice in terms of social services. Isolation may mainly impact on the family through its children and be felt by adults because of their desire to achieve a good 'succession of family responsibility')

5 Enjoying farming (Farming has many unpredictable features that can put stress on family members. People who do not enjoy the benefits of farming will not stay and so enjoying farming is essential for people to stay on the land)

This earlier work also showed that farming families were making decisions and taking action to satisfy these motivations in a way that could be described in terms of systems. Three systems were especially important in the study as decisions made in these three systems could relate directly to land use. The family decision system was supported by the Farm business trading decision system and the Land ownership decision system.

The current project takes up the investigation at this point.

So far we understand:

- That farming families are making decisions about specific opportunities to provide ongoing outcomes to satisfy their long-term motivations (aspirations) as represented by these five stories.

- That most of their decisions that lead to land use are made within three decision systems.

- That individual people experience stages in their lives so that the emphasis between these stories changes as their family mature.

2 THIS PROJECT
The emphasis in this project moves from discussing motivation towards discussing how farmers recognise the suitability and availability of opportunities that, in their view, will satisfy their family motivations (aspirations).

We recognise that opportunities have two parts; external aspects (eg. existence of a market) and internal aspects (eg. existence of skills).
Understanding Farmer Decision Systems That Relate To Land Use

To investigate this we would like farmers to discuss how they view different opportunities; ones they are taking up, ones they are moving out of, ones they nearly took up and the ones they decided against and ones they propose to take up. We want the farmers to talk about the external and internal aspects of these opportunities and the decision systems in which they occur.

To help establish this discussion with farming families we propose to commence the interview with an explanation of what we want to discuss then use the some questions to guide the discussion.

**Explanation**
The farmers will gain a first introduction to the study when we go through the Plain English document and the Consent Form with them. In the subsequent minutes we will tell them the following:

- We want to discuss the situation in which you decided to undertake an action that related to land use. We want to know what aspects of the opportunity you saw nearly made you decide 'no' and what factors made you say 'yes'. (We can call these critical factors of the decision situation). We also want to discuss the situation in which you decided against taking action.

- We want to understand what aspects of the opportunities were critical in your decisions to take up or not to take up the opportunity. We want to know whether these critical aspects were something to do with you personally (your skills or lack of skills etc.) or something to do with the opportunity itself (good market or expensive inputs etc.). We can call these internal and external factors respectively.

- We want to understand these aspects for land use decisions you make in regard to your (1) farm trading business, (2) land ownership and (3) land use decisions that relate to the wishes of your family.

**Questions to guide the discussion**

**Farm Trading Business Decision System**

1. What does the farm trading business (selling farm products) contribute to your family?
2. Can you tell me about some of the ongoing enterprises on your farm? (Decisions to continue to take up an existing opportunity in the farm trading business).
3. What features in these activities are important to you in deciding to continue with these enterprises? (Internal and external critical factors).
4. What changes would have to happen for you to consider ending / expanding / changing this enterprise?
5. Can you tell me about any new enterprises you have taken up on your farm?
6. What changes occurred that enabled you to take up this new enterprise? (Internal and external critical factors).
7. What factors nearly make you decide 'no' to this new enterprise (or expansion of an existing one etc.)
8. Were these changes related to external factors (eg. change in market or availability of finance) or to internal factors of the opportunity (eg. you learnt how to undertake the enterprise, you had the resources and land already).
9. What enterprises have you recently moved out of?
10. What were the most important changes that led to your decision to stop your participation in this enterprise? (external and internal critical factors)

**Land ownership Decision system**

1. Can you tell me whether or not you own any farmland, are currently buying farmland or have recently sold farmland? Is this the land you currently farm?
2. If your family owns land, what does this land ownership contribute to your family? (buying, holding and selling farmland)
Understanding Farmer Decision Systems That Relate To Land Use

1. What aspects of the land ownership are critical to your decisions in relation to land ownership?
2. What aspects of land ownership would have to change for you to take different decisions about land ownership? (internal and external factors)
3. Are your land ownership decisions related to your views about the future use of farmland?
4. If you owned farmland would you try to improve its sale value and what would that entail?
5. Do you own land / property that you do not farm?
6. How does the decision to buy land / property other than the land you farm relate to your ideas of land ownership?
7. If you want to expand the area you farm would you buy or lease land?

Family decision system
1. How does the family influence the way you run the farm business / buy or sell farmland?
2. What does being a farmer and living in a rural area mean for your family members? (Positives and negatives).
3. If you decided to leave farming what external / internal factors would be relevant?
4. What are the critical benefits (negatives) for your family to stay (consider leaving) in farming and living in a rural area?
5. What would have to change for you to decide to take up another occupation? (full-time or part-time)
6. What would have to change for you to decide to move to another location, perhaps to a town or city?
7. What changes seem to be coming that might influence the future for your children's generation in farming / rural living?
8. What would have to change for you to decide to expand your farming activities / invest more time in farming? Or reduce your farming activities / invest less time in farming?
9. How can you prepare for the future / what can you do now to best help your family in the future?

The discussion can be conceptualised in the form of a matrix. The table below gives some examples of possible answers in regard to specific opportunities.

**Table 1.** Example of possible responses to questions about the availability aspects of opportunities in the three decision systems

<table>
<thead>
<tr>
<th>DECISION SYSTEM</th>
<th>OPPORTUNITIES THAT YOUR FAMILY TOOK UP / DECIDED AGAINST TAKING UP RECENTLY</th>
<th>What seasonal issues are relevant?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>What things encouraged you to take up the opportunity?</td>
<td>What things nearly prevented you from taking up the opportunity?</td>
</tr>
<tr>
<td></td>
<td>External aspect of opportunity</td>
<td>Personal aspect of opportunity</td>
</tr>
<tr>
<td>Farm trading business decision system</td>
<td>Ability to buying in help &amp; resources</td>
<td>My existing knowledge, skills, time, resources and confidence</td>
</tr>
<tr>
<td>Land ownership decision system</td>
<td>Existence of property markets, finance, tax, agents</td>
<td>Own knowledge and confidence</td>
</tr>
<tr>
<td>Family decision system</td>
<td>Available advice that it would help the family</td>
<td>Own knowledge, emotional experiences and family expectations</td>
</tr>
</tbody>
</table>
Appendix 3. Plain English Statement

DRAFT OF LETTER

University
Design and Social Context Portfolio
School of Social Sciences and Planning

Dear XX

My name is Quentin Farmar-Bowers and my colleague is Ruth Lane. We are from RMIT University and work within the School of Social Sciences and Planning which is in the Design and Social Context Portfolio. We are undertaking a research project called "Understanding Farmer Decision Systems That Relate To Land Use".

We are writing to ask you if you would like to help in this research project by participating in a confidential interview conducted by Quentin Farmar-Bowers that will take about 2 hours. Participation is entirely voluntary and we will give you $100 towards your expenses. You may withdraw from the study at any time and also withdraw any unprocessed data.

We will ask your permission to record the interview so that we can transcribe your remarks and use them in our research. Ruth Lane will securely store the recordings and transcripts of the interviews at RMIT University. We will use code numbers rather than names in transcribing and analysing the interviews so your identity will remain confidential throughout the project and in subsequent publications.

In the interview Quentin will ask you (and your partner) questions about your family's long-term goals (motivations or aspirations) and how opportunities in farming and rural living are helping you meet these goals. We want you to discuss in your own words what you think about the opportunities you have taken action on already and some of the ones you are thinking about taking up, or decided against.

The Department of Sustainability and Environment is providing the funds for this research and we are getting some 'in-kind' help from the Department of Primary Industries. The final report of the project will be sent to the Department of Sustainability and Environment. We would be happy to send you a copy of the report if you wish.

Because we do not have contact with farmers we approached XXXXXXXXXXX who kindly agreed to forward this letter to you.

If you would like to participate in an interview please put your name and contact details on the enclosed form and return it to us at RMIT University (a stamped return envelope is enclosed). Alternatively you can contact us directly - our contact details are given below. If you agree to an interview I will call you to organise a suitable time and date.

We hope that the results of this research will help government agencies develop programs that will be in tune with the long-term needs of farming families and in particular help farming families improve the sustainability of their farms.

Our contact details:

Ruth Lane, PhD, phone: 03 9925 3578
e-mail: ruth.lane@rmit.edu.au
Quentin Farmar-Bowers, PhD, home phone: 03 9571 6504
e-mail: quentinfarmarbowers@dodo.com.au

OR
School of Global Studies, Social Sciences and Planning
RMIT University, GPO Box 2476V Melbourne VIC 3001

Yours sincerely

Ruth Lane and Quentin Farmar-Bowers

Any complaints about your participation in this project may be directed to the Executive Officer, RMIT Human Research Ethics Committee, Research & Innovation, RMIT, GPO Box 2476V, Melbourne, 3001. The telephone number is (03) 9925 2251. Details of the complaints procedure are available from the above address.
Author/s: Farmar-Bowers, Dr Quentin; Lane, Dr Ruth

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