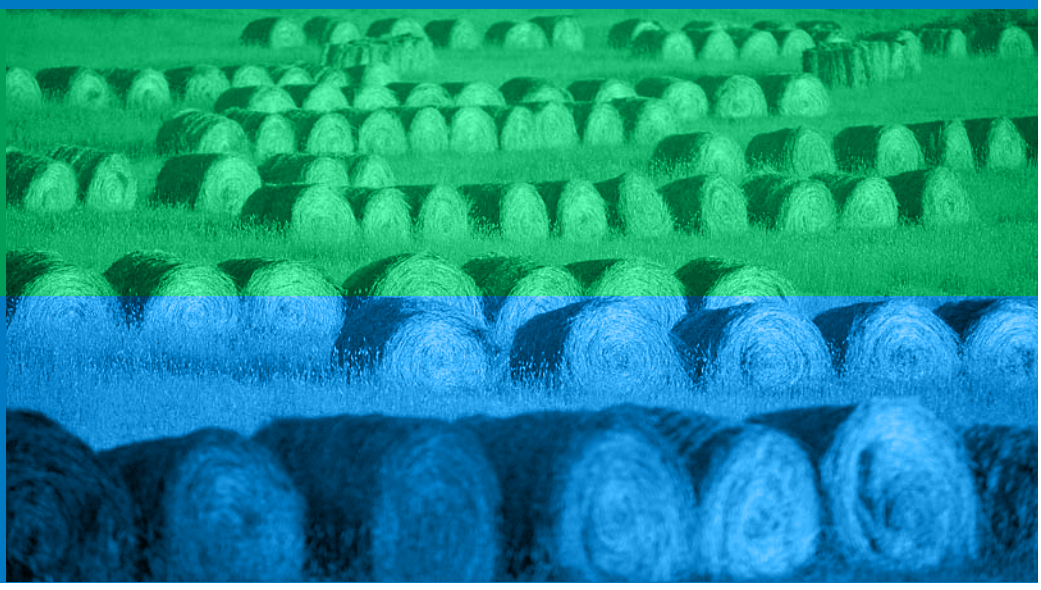
Study on Identifying Rural Sociological Barriers to Adoption

Final Report

Submitted by Alberta Research Council

August 1, 2006



The Alberta Environmental Farm Plan Company

ALBERTA RESEARCH COUNCIL
SMART THINKING. POWERFUL SOLUTIONS

Agriculture and Agri-Food Canada
Prairie Farm Rehabilitation Administration

Agriculture et Agroalimentaire Canada
Administration du rétablissement agricole des Prairies

Alberta

Study on Identifying Rural Sociological Barriers to Adoption

Final Report
Submitted by Alberta Research Council
August 1, 2006

Project Manager
Dr. Ross Mitchell

Alberta Research Council
250 Karl Clark Road
Edmonton, Alberta

Phone: 780-450-5260
Fax: 780-450-5083
E-mail: mitchell@arc.ab.ca

Submitted to:
Therese Tompkins, Program Director

The Alberta Environmental Farm Plan Company
801, 4445 Calgary Trail
Edmonton AB T6H 5R7

Phone: 780-436-2339
Toll-Free: 1-866-844-2337
Fax: 780-436-2382

Note to Reader

The following research is the outcome of a partnership between:

- Agriculture and Agri-Food Canada;
- Alberta Agriculture, Food and Rural Development;
- The Alberta Environmental Farm Plan Company; and
- Alberta Research Council.

The opinions and information expressed in this report do not represent the viewpoints held by the members of the partnership, individually or collectively. The data collected and presented is for information purposes only.

Copies of this report are available from:
The AEFP Company
801, 4445 Calgary Trail
Edmonton AB T6H 5R7

Phone: 780-436-2339
Toll-free: 1-866-844-AEFP (2337)
Fax: 780-436-2382
Email: info@AlbertaEFP.com
Website: www.AlbertaEFP.com

FOREWORD

This research was led and funded by a team comprised of Agriculture and Agri-food Canada – Prairie Farm Rehabilitation Administration; Alberta Agriculture Food and Rural Development; and the Alberta Environmental Farm Plan Company. The Project Manager was Ross Mitchell, a Research Scientist with Sustainable Ecosystems, Integrated Resource Management, Alberta Research Council. Jennifer Karpyshyn, Project Coordinator and Marke Ambard, Rural Sociologist, both also with the Alberta Research Council, conducted key components of this research, including much of the fieldwork and analysis.

ACKNOWLEDGEMENTS

Alberta Research Council gratefully acknowledges several staff members for their invaluable help in preparing this report during the period of January until the end of July 2006. For their assistance in conducting primary and secondary research, collecting information, and analyzing results, we wish to thank Marke Ambard, Karen Brown, Michelle Hiltz, Jennifer Karpyshyn, and Pat Soldan. For their administrative assistance and editorial duties in the preparation of this report and related products, we wish to thank Donna Bagdan, Elaine Cannan, Valerie Golka, Corinne Skulmoski, Susan Stecyk, and Jodi Tauber. We also thank Shawn Gervais, Larry Roy, and Marian Weber for their sound advice provided on occasion throughout this project.

We also thank all those individuals who consented to be interviewed and willingly shared their views or otherwise provided useful information for this research. In particular, we thank those who enthusiastically participated in two focus groups held in St. Paul and Fairview.

Finally, we wish to extend our sincere appreciation to Therese Tompkins, Ken Lewis, Hugh Bailey, Karen Goad, and Julie Kennett, as well as several of their staff members and colleagues, who provided very useful feedback and direction during the course of this research. It was through many fruitful conversations and interchanges of ideas that the research methodologies were adapted to best meet the needs of the clients and stakeholders for this project.

Any errors or omissions are the responsibility of the Project Manager.

TABLE OF CONTENTS

List of Appendices

List of Tables

EXECUTIVE SUMMARY

This report is based on research conducted by the Socio-economic and Policy Research Group, Sustainable Ecosystems Unit, of the Alberta Research Council (ARC) during January 1 to August 1, 2006. The main purpose of this work was to gain an improved understanding of rural social needs in Alberta's agriculture communities. The research was intended to assist the principal client - the Alberta Environmental Farm Plan Company (AEFP), in partnership with Agriculture and Agri-Food Canada, Prairie Farm Rehabilitation Administration (AAFC - PFRA) and Alberta Agriculture Food and Rural Development (AAFRD) - Alberta Environmentally Sustainable Agriculture (AESA) and Ag-Entrepreneurship and Food Safety Divisions - in the development, improvement and/or delivery of effective extension programs.

A total of six chapters form the body of this report, as follows:

Chapter 1 - Introduction
Chapter 2 - Literature Review
Chapter 3 - Methodology
Chapter 4 - Findings
Chapter 5 - Discussion
Chapter 6 - Recommendations and Conclusion

RESEARCH STEPS

This project investigated key motivators and barriers – or 'social needs' – of farmers and landowners in Alberta to adopting conservation and food safety beneficial management practices. The project consisted of the following two phases:

- In Phase 1, the Alberta Research Council designed a Study Plan to address how social needs vary throughout the adoption process, as well as within and between different 'communities of interest.' Most of this phase consisted of a detailed literature review and meetings with the Management Committee.

- In Phase 2, the Alberta Research Council implemented the Study Plan through selected sociological methodologies: door-to-door surveys, expert interviews, and two focus group sessions. We also were asked to suggest extension protocols that best address how social needs vary throughout the adoption process. In other words, how these questions should be used and evaluated by extension staff, the end users of these protocols.

STUDY PURPOSE AND METHODOLOGY

This project was premised on the belief that adoption of conservation and food safety beneficial management practices is affected not only by economic factors, but also by a host of other socio-psychological variables. It was believed that a greater understanding of key social barriers to the adoption of conservation and food safety beneficial management practices in Alberta – and exploring the ways in which extension practices affect these factors – would provide an improved understanding of adoption issues, thereby providing policy makers and extension deliverers with critical knowledge to better fulfill their respective roles. Specifically, this project explored the key motivators and barriers of Albertan producers and how these influence (or could influence) the adoption of conservation and food safety beneficial management practices. The two main questions for this research were:

1) Social Needs: What are the 'social needs' that affect the adoption of conservation and food safety beneficial management practices by producers; and

2) Extension Protocols: How does an understanding of the 'social needs' of producers affect extension and the protocols it should use to promote adoption of conservation and food safety beneficial management practices?

This study involved a unique set of sociological research methodologies - including household surveys, focus groups, and key informant interviews – with a primary focus on qualitative questions, although several quantity-type questions were also asked and analyzed. This mixed methods approach was chosen due to the complex nature of the topic and of the respondents being sampled (farmers, ranchers, and farm direct marketers, or a combination of all three). It was believed that a qualitative approach would allow for greater depth in data collection and improve our understanding of the issues. Moreover, due to the difficulties of accessing a reliable sample list from which to draw a random sample, as well as the potentially controversial subject matter being discussed, the project team concluded that a more personal approach was preferable.

The mixed methods approach was also used to highlight for extensionists, the target audience of this research, the pros and cons of using different sociological methodologies. The added benefit to this has been an increased reliability in the data collected due to the ability to compare across methodologies to validate findings – a technique also known as triangulation.

Data collection was carried out between March 15 and May 6, 2006. Although less than originally hoped for, a total of 62 face-to-face interviews were conducted for the household survey, with two additional surveys mailed in, for a total survey sample of 64. There were 47 surveys in southern Alberta (Special Areas, 40 Mile House, and Acadia), 7 in Central Alberta (Ponoka), and 10 in northern Alberta (Fairview and St. Paul). Two focus groups were also conducted: one in St. Paul that was focused on conservation and general agricultural issues, and one in Fairview focused on food safety and farm direct marketing. A total of 8 participants were present at each of these two focus groups, with female producers comprising 75% of the total (more by chance than design). Finally, 10 key informant

interviews were also conducted over the phone. All key informants were extensionists from both the food safety and conservation extension fields, and almost all were from a 'high priority' list generated by the client.

KEY FINDINGS

Farm Household Survey

The following is a synopsis of key findings. Due to the small sample size, the statistical analyses should be viewed with caution. They are useful nonetheless for pointing out possible trends.

Farm Management Decisions. Only 22% (n=64) had a farm management 'team' and of these 93% (n=14) had an accountant, banker, and/or financial advisor. A large majority (91%, n=64) stated that other family members contribute to their farm management decisions. Perhaps not surprisingly, the family member that was considered to have the greatest influence on their farm management decisions was the spouse. Most of those who contributed to farm management decisions either were neutral (47%) or encouraged (37%) the respondent to adopt beneficial management practices (n=62).

Barriers to Adopting Beneficial Management Practices. Almost half (47%, n=58) had heard of certain beneficial management practices but had not yet adopted them for some reason. Most had not yet adopted due to inadequate revenues (64%, n=64) and unfavourable market conditions (60%, n=63). Other important reasons for not adopting were: a perceived lack of personal benefits (31%, n=64); the complexity of the practices and the fact that environmental improvements were not a priority (24%, n=64 and 63, respectively); conservation agencies are not trustworthy (22%, n=63); and/or family is not supportive of adopting (14%, n=63).

Information Sources. The five most popular sources of trustworthy information about new farming and food safety practices or innovations were (overlapping categories); magazines (89%), neighbours (88%), professionals and/or specialists (75%), workshops, field days, and/or tours (72%), and producer groups, clubs, and/or associations (70%). When asked to rank the top three sources, the 'professionals' and 'workshops/field days' were the most trustworthy (19% each, n=62). The second most trustworthy source of information was magazines (17%, n=53), and the third was 'producer groups, clubs and/or associations' (12%, n=33).

Producer Types. Three producer types emerged from the sample: conventional (78%), alternative (12%) and status producers (10%, n=64). These producers were recognized by their differing opinions regarding the use of chemicals and/or their disposition towards standard agricultural practices. Status producers tended to prioritize humans over nature, alternative producers were of the opinion that conservation practitioners are not well-respected in the community, and status producers put greater trust in structured settings for

receiving information. 94% of conventional producers trusted their neighbours for information, about 30% higher than either alternative or status producers.

Worldview. Producers diverged in their beliefs about nature and society. Those tending towards the New Environmental Paradigm (27%) believed that nature had value for its own sake and should be protected, and that current agricultural practices do harm nature. Those tending towards the Dominant Social Paradigm (8%) disagreed with these statements, believed humans were meant to rule over the rest of nature, and that humans were separate from and superior to nature. Those in the middle category (66%) expressed often contradictory beliefs (n=64).

Forms of Capital. Economic capital was found to influence the adoption of conservation and food safety beneficial management practices, but it was not the only influential form of capital. Social, cultural and status capital were all found to contribute to the adoption behaviour of producers.

Farm type was not found to influence adoption behaviour, but socio-psychological, environmental, and institutional variables did.

Focus Groups

The themes raised and discussed by the St. Paul focus group were: extension information; the structure of agriculture; sustainable farming practices; policy; and the future of agriculture. The Fairview focus group was based around issues of food safety and farm direct marketing, and the themes raised by these participants were issues of finding information; dealing with requirements; tradition and practice change; and their contact with consumers.

Key Informant Interviews

These informants were selected for their expertise and to represent a variety of perspectives in terms of the practice of extension. Informants indicated that the skills and training of extensionists, the types of tools used, the type of the information dispersed, and the nature of the producers targeted were key areas affecting the practice of extension. They felt that policy continues to affect adoption, and they called for more focus on the consumer, more science to validate practices, and greater objectivity. The future and sustainability of agriculture was also deemed important.

Data Collection Summary

All three methodologies (surveys, interviews, focus groups) demonstrated that both one's beliefs and practices play important roles in issues of adoption. This not only applies to those of producers but to those of extensionists as well. Beliefs might seem more difficult to deal with in terms of programs or policies, but dealing with and planning for beliefs and how

these affect adoption should receive more attention. Doing so will require much greater empathy and flexibility on the part of extensionists.

Producer Types and Worldview

This research supports past work in terms of how producer type and worldview are associated. Specifically, alternative producers often expressed a worldview that places more value on nature, and conventional producers mainly communicated a worldview moving toward a societal (human-oriented) emphasis on the worldview continuum. It is clear that there is a divergence among producers as to what 'nature' is, and therefore, what 'conservation' should be, and what should be conserved. This complicates extension activities.

Zero tillage

Zero tillage represents an interesting example of how beliefs can pose interesting challenges for extension and conservation. Many conventional producers equated zero tillage with conservation, to the point that several survey respondents based their responses on their experiences with zero tillage as conservation in general. Zero tillage provides some important environmental benefits, such as reducing soil erosion and retaining moisture, but it is clear that conservation is more than zero-till. Despite this, many producers were hard-pressed to think of any other conservation practices they could adopt other than zero-till.

Extension Based on Producer Types

Our producer types can provide extensionists with an opportunity to hone specific programs for a given audience. This research showed that the needs of alternative producers are not being met by government extension programs; biodiversity is not a relevant issue for conventional producers; and, status producers prefer detailed, thorough information as opposed to simplified messages meant to sell a practice. Understanding producer types can allow extensionists to better target their programs for the audience being addressed.

Conservation and Food Safety Beneficial Management Practices

The adoption of conservation and food safety beneficial management practices was treated in this research as two facets of the same issue. There was an underlying assumption in doing so that these two branches of extension shared similar challenges in encouraging adoption, and that the motivators and barriers would be similar enough to allow discussion of them both at the same time. The findings show many areas of overlap between the conservation and food safety realms; many motivators and barriers are indeed similar between the two. However, key differences should be recognized. Collaborative efforts between these two areas were

important and should be continued in the future, primarily for the benefit of the producers, but also to increase effectiveness in extension delivery.

Motivators and Barriers

When asked about barriers to adoption, the most common responses had to do with financial or technological reasons. Financial barriers were expected to be those that producers would bring up most frequently, but a key project goal was an understanding of 'other' variables that prevent producers from adopting. The fact that technological considerations should be placed among the most important barriers to adoption is a finding consistent with other research into the adoption of beneficial management practices and it confirms the recommendations of those who call for greater consideration of the technological appropriateness of such practices. While some barriers such as the environment were not priorities for many, a lack of trust towards conservation groups and family members not supportive of conservation improvements illustrates that economic barriers were not the only factors affecting non-adoption.

Sociology in Extension

A number of different methodologies were used in this research to illustrate the type of information best gathered from each. We found that agriculture is not an individual endeavour, but is situated within a complex social context. For extensionists hoping to better understand the adoption behaviour of producers, our results show that the theory and practice of rural sociology can lead to an increased understanding and communication.

KEY RECOMMENDATIONS

A total of eight recommendations were made in this research, focused on two general categories: the first four focus on 'Social Needs to Adoption' and the following four on 'Extension Protocols,' as follows:

1. Barriers to adoption are complex, and not necessarily 'barriers.'
2. Financial aspects, while important, are not the only motivators or barriers.
3. Most producers fall in the 'middle of the pack' in terms of farming styles and worldviews.
4. Conservation and food safety beneficial management practices share many adoption issues, yet may require different treatments.
5. Extensionists need to recognize their own biases or worldviews and those of producers.
6. Methodological tools need to be carefully considered and innovative approaches tried.
7. Use a diverse set of protocols that are both adaptable and adoptable for producers.

8. Producers and extensionists alike need more discussion on what constitutes beneficial management practices.

Social Needs to Adoption

The first question asked for this research was, "What are the key sociological motivators and barriers to adopting environmentally responsible and food safety beneficial management practices?" Four key 'social needs' or factors emerged through this research, which are described below in detail, along with recommendations for agricultural policy makers, managers, and extensionists to consider.

1. Barriers to adoption are complex, and not necessarily 'barriers.'
Determining what discourages or motivates producers to adopt beneficial management practices is not easy. For example, youth, higher education, and 'families that farm together' are demographic variables that often show a positive relationship to the likelihood of adopting conservation practices, but the reverse may also be true. We found that multiple factors are at play whenever a producer chooses to adopt a given beneficial management practice (or not). Key barriers include access to 'capital' (economic, social, cultural, status, etc.), worldviews (beliefs and attitudes), type of technology, government policies and programs, demographic features (such as age and education), and ecological factors. All of these may interact and even conflict with each other to sometimes produce unpredictable results. However, so-called 'barriers' may be only misunderstandings on the part of extensionists, who may attribute resistance to change to factors such as lack of education, when in fact resistance may lay in one's farming 'style' or worldview. The latter could be a grand opportunity for targeted efforts. Barriers to adoption of beneficial management practices are often termed as such without fully understanding the underlying or complicating factors as this study has attempted to do.

2. Financial aspects, while important, are not the only motivators or barriers.
Our research confirmed what many producers have been telling extension agencies for years – 'economics' form only part of the puzzle (although still significant). We confirmed that economic issues are still the main driver for the majority of producers. These include commodity and input prices, land costs, debt loads, credit programs and incentives or restrictions, and market competitiveness. Yet, our survey results showed that monetary issues are often linked or even surpassed by other aspects such as one's cultural capital (farming style), education, or worldview. Individual behaviours or 'habitus' (e.g., worldview, human capital, tradition), and external influences or 'fields' (e.g., markets, peers, programs), both condition and direct one's agricultural practices. An understanding of both spheres of action (habitus and fields) is needed for a given agricultural or food safety policy or program targeted at producers. Potential financial gain can be counter-balanced by time, lifestyle, family, land tenure, risk, policy, or many other factors. Distrust is also a barrier for those that feel misled by government policies and programs. More emphasis is needed on the social aspects of farming, ranching, and food safety, including institutional, demographic, and attitudinal factors, for a more holistic approach.

3. Most producers fall in the 'middle of the pack' in terms of farming styles and worldviews.

Our survey research categorized and compared three types of producers (or farming styles): conventional, alternative, and status producers. These producers were recognized by their differing opinions regarding the use of chemicals, and/or their disposition towards standard agricultural practices. Conventional and alternative (generally organic) producer types are consistent with other research into conservation adoption in agriculture, whereas the status type was described as a relatively small but potentially influential group that maintain their status through their large farm or ranch size, immaculate yards, their business-like operating style, and an attitude of striving to be 'the best' in their specific community and/or sector. The large majority (78%) of our survey respondents were conventional, 12% were alternative, and 10% were status producers. Most respondents (86%) communicated a worldview that combined beliefs from opposing ends of the New Environmental Paradigm - Dominant Social Paradigm spectrum. This means that any efforts taken to pigeonhole producers by their farming styles or attitudes are not so straightforward. This should be good news for extensionists since it may be much harder to work with those holding rigid or narrow beliefs, no matter at which point of the pro-profit vs. pro-environment scale they feel themselves belonging to.

4. Producers and extensionists alike need more discussion on what constitutes beneficial management practices.

Exactly what constitutes sustainable or 'beneficial management practices' is not so clear when categorizing producers. We found substantial agreement on what constitutes beneficial management practices (with the important exception of alternative producers). For example, many said that zero or reduced tillage is now the new 'right' way to farm, equating this practice with conservation. However, and perhaps paradoxically, zero or reduced tillage is generally accompanied by herbicide spraying, a practice rejected by most alternative producers and not appreciated by at least some consumers. Producers' negative perceptions of weeds can have consequences on their own practices as well as how they judge the quality of other farms and alternative farming practices. This suggests that conservation messages might be over-simplified. It is also unclear how the 'social needs' of those holding minority views will be addressed. Another example of beneficial management practices mentioned in this research by a minority of survey respondents includes managing for biodiversity and wildlife. However, respondents generally referred to wildlife, if at all, as 'pests' such as coyotes, badgers, and gophers. More work needs to be done to understand how producers define nature and how this translates into the practices they adopt. The many conventional producers in our survey who expressed a 'mixed' worldview testifies to this ambiguity. Conservationists might adhere to a view of nature and conservation premised on issues such as biodiversity and watershed values, but which is contrary to some producers and agricultural extensionists. Dissimilar beliefs will serve as a primary roadblock to meaningful discussion if those proposing actions choose to disregard what producers believe is 'right.' Consistency is needed on information delivery for what is considered a 'good' beneficial management practice, and why.

Extension Protocols

The second question asked in this study was, "How does an understanding of the social needs of producers affect extension and the protocols it should use to promote adoption of conservation and food safety beneficial management practices?" Four key extension protocols or considerations that emerged through this research are described below in detail.

5. Extensionists need to recognize their own biases or worldviews and those of producers.

Our survey research showed that each producer has a particular worldview towards farming or ranching. This worldview - whether environmentally-driven or profit-oriented (or more likely a complex mix of both, but perhaps leaning to one side) - will have a major influence on ones' practices. Each particular worldview should be acknowledged and respected by extensionists, and appropriate steps taken to deal with them. Potential 'barriers' can translate to opportunities for targeted programmatic efforts. We also found that each extensionist and the agency they represent also have their own worldview, whether openly expressed or not. Extensionists representing different worldviews also need to work more closely with each other to ensure that the messages being diffused to (or discussed with) producers do not necessarily have to contradict each other. Discussing and appreciating others' views is a necessary step to building trust and successfully achieving policy or programmatic goals and objectives. Ideally, each extension institution should have a strategic plan to assess and account for various worldviews. Each producer should be assessed for their particular worldview for improved effectiveness. A survey approach could be combined with direct observation of specific operations (e.g., farming styles, yard appearance, care of on-site natural areas). In certain scenarios, a specific group may need to be assessed, in which case the extensionist could employ group tactics, preferably by an expansion of the individual approach. Whatever the case, the savvy extensionist will adapt his or her approach(es) to carefully consider and address whichever 'worldview' is encountered.

6. Methodological tools need to be carefully considered and innovative approaches tried.

Extensionists need to consider both new and 'tried and true' tools for acquiring information on producer's needs or perspectives. Our research with its mixed-methods approach suggests that different tools are needed for different ends. Many agricultural and conservation agencies rely on attitudinal surveys to obtain useful information to develop or support specific policy and program initiatives. However, structured surveys have serious limitations, including intrusiveness, respondent 'burn-out,' costliness, and an overt focus on quantitative, 'stats friendly' data at the expense of more meaningful results. We suggest face-to-face (or door-to-door) surveys for collecting qualitative data, as well as building trust and sharing concerns in a non-threatening space. With this technique, additional 'data' can be obtained such as body language and facial cues that would be impossible over the phone or through mail-out surveys. On the negative side, besides the high labour cost and critical importance of timing (early mornings and later afternoons or evenings may work best, as well as non-busy times of the year such as the winter), entry may be difficult. Some people do not appreciate home visits from strangers, and the extensionist may be seen as interfering in their practices. Rejection rates could be lessened by a phone call beforehand to arrange the visit,

although this may not always be feasible or people may choose not to answer the phone. Our research also showed that well-prepared focus groups of 5-12 people can be a very effective approach. These should be held with an experienced facilitator to achieve maximum effectiveness, such as ensuring a reasonable quality of discussion and equality of 'voices' around the table. The same facilitator should be used for all focus groups if conducting comparative research. An effective focus group organized by extension agencies should be treated more as a 'data gathering' tool to discuss and debate, collect, and analyze opinions on a short list of issues or questions. It should be participant driven as much as possible to build trust and ensure openness. This looser yet structured approach would allow for greater comfort and freedom for the participants, while at the same time providing valuable information for extension agencies.

7. Use a diverse set of protocols that are both adaptable and adoptable for producers.

Our research showed that extensionists should not be constrained to one set of protocols (tools or practices) when working with producers in Alberta. Every producer's set of circumstances is unique (geography, farm structure, crop/livestock type, family needs, worldview, etc.). Extensionists need to rely upon and customize a wide diversity of protocols which are practical, better than what came before, have proven benefits, and conform with producers' ideas of the 'right' way to farm and ranch. Extension protocols should be adapted or fine-tuned to each special set of circumstances, and whenever possible, combined with other tools to ensure reliability and increase effectiveness. Our survey analysis also indicated that different extension delivery instruments may have to be used for different kinds of producers. Whichever protocols are selected, the extensionist must make difficult trade-offs in factors such as cost, training, complexity, time, and effectiveness. Flexibility, responsiveness, and an ability to deal with complexity in extension are necessary. In some cases, the extensionist should try an individual and open-ended approach for more independent-minded folk (such as some ranchers) or relatively isolated producers (for example, in Special Areas). Informal and personal chats can 'break the ice' or deal with controversial topics, whereas group approaches (focus groups, community dinners, Town Hall meetings) may work better when dealing with like-minded producers with similar worldviews, or if genuine deliberation is desired by sponsoring agencies.

8. Conservation and food safety beneficial management practices share many adoption issues, yet may require different treatments.

Despite their differences, conservation and food safety beneficial management practices were considered as distinct yet interrelated components. Since food safety aspects - production, processing, packaging, storage, and distribution - directly affect both environmental and human health, these practices are really two sides of the same coin. Our research found that, when discussing adoption of conservation and food safety beneficial management practices, the most relevant social factors are practicality and suitability, cost, tradition, fear and emotion, relationships with extensionists, and beliefs and values. Adequately combining food safety issues with those of conservation could help diffuse food safety practices more quickly, and reach a larger audience due to the pervasiveness of conservation extension. However, we also encountered some confusion around food safety, perhaps partly due to the fact that only 20% of respondents were engaged in farm direct marketing. Yet all producers likely have particular food safety perspectives that must be considered. While conservation

has surged ahead in the consciousness of producers and consumers alike, food safety seems to be still in its early stages of diffusion. While they may differ from conservation practices and need to be treated separately in some cases, food safety issues are not isolated from agricultural, environmental, socio-economic, or other perspectives. Food safety is interrelated with all farm-based activities, and agencies working in this area should find ways to collaborate for the well-being of producers, but also to increase efficiencies in extension. Still, while conservation and food safety beneficial management practices share many adoption issues, these practices may have to be treated separately in some circumstances. Extensionists dealing in food safety information will have different challenges than those dealing in conservation. For food safety extensionists, it may mean contracting engaging speakers on food safety who understand their audience and know how to make food safety information accessible and relevant to producers.

In conclusion, our research has demonstrated that the agricultural community is neither a homogenous entity nor straightforward – there are likely as many views and opinions as there are kinds of producers. Consequently, any steps taken to address barriers to adoption of conservation and food safety beneficial management practices must be tailor-made and adaptable to be adoptable. While we believe we have advanced an understanding of producers' social needs and crucial considerations on protocols for extensionists, we also recognize that much remains be done. Rather than categorizing Alberta's producers by their specific type or place of operation, however, we recommend that extensionists focus their energies on the many diverse attitudes and beliefs of producers – their worldview is a key entry point. This also includes interactions or 'fit' among extensionists and producers within specific communities and regions, industries, and agencies. It is in this rich but less understood arena of personal perspectives and social networks that should see concentrated efforts for the adoption of conservation and food safety beneficial management practices.

1. INTRODUCTION

Agricultural and food practices affect the environment and consumer alike and differ across many contexts, a rich milieu which includes socio-cultural, economic, health, technological, political, and geographic perspectives, as well as spanning various spatial and temporal scales. While a wide diversity of stakeholders are making demands on Alberta's diverse environments, farm and ranch operators are being asked to grow and handle their produce in ways that may significantly differ from previous practices. Yet our ecological and social knowledge and resultant policies have not kept pace with these demands.

In recent decades, a marked shift has occurred in the relationship between producers and consumers. This shift is due to many factors: to name a few, the burgeoning environmental movement, our continued scientific understanding of ecological processes and crises, the rising demand for environmental goods and services such as high biodiversity and clean air and water, a perceived or actual deterioration of the same environmental resources, a growing acreage movement (urbanites moving back to the country and living in close proximity to practices they might have issue with), concerns for human and animal health due to recent epidemiological crises (such as the Bovine Spongiform Encephalopathy or mad cow disease), and institutional changes in extension services. As a result, producers and consumers alike are asking for better information on how our food and associated by-products are produced, processed, stored, and distributed.

An example of these trends can be seen in how public extension was once regarded as an integral and highly visible part of the Canadian agriculture scene, with the government largely responsible for its delivery (see Appendix 1 for a summary of the history of agricultural extension in Alberta). Extension in Alberta and elsewhere has become increasingly more specialized and has taken on a commercial or industrial nature, a trend already evident in the early 1980s (see Baker 1987). Another trend over the past two decades or so is the increased consideration of conservation and food safety practices in agriculture by producers and extensionists alike. These practices are sometimes defined in market-specific or production-oriented contexts, but are more commonly thought of as safeguarding the public good. In Alberta, they are often expressed as 'beneficial management practices' (also known as best management practices, or BMPs). These beneficial management practices are expected to help the producer meet production, conservation, and food safety goals. Examples of such practices include manure odour control, riparian protection, crop rotations with 'green cover,' wintering sites, petroleum storage, environmental testing, zero tillage, and careful food handling and storage.

The adoption of conservation and food safety beneficial management practices poses a very unique set of obstacles and concerns to the producer, changing the dynamics of the decision-making process (Clearfield and Osgood 1986; Feder and Umali 1993). While certain conservation measures have been readily adopted – such as minimum or zero tillage to reduce erosion and lime application to treat acidic soils – other measures have seen only modest adoption at best (Pannell et al. 2005), and food safety beneficial management practices have often been ignored. A much greater understanding of the issues is needed if extension is to enhance and expand the adoption of sustainable practices in agriculture and

food safety. Substantial research has been done on the adoption (and non-adoption) of conservation or beneficial management practices (e.g., Clearfield and Osgood 1986; Pannell et al. 2005; Vanclay 2004), as well as purely technical innovations (e.g., Abadi Ghadim and Pannell 1999; Feder and Umali 1993; Guerin and Guerin 1994). However, while several related studies have been carried out in the United States, Australia, and Europe, as well as certain developing countries, a paucity of research exists for Alberta or other parts of Canada.[1] In addition, very little work has focused on barriers and motivators to the adoption of food safety practices, and generally speaking, 'conservation practices' in other research do not seem to include food safety practices. There is no reason that this should be the case, however. For the purposes of this research, both conservation and food safety best practices are considered as 'beneficial management practices.'

1.1 RESEARCH PURPOSE

As discussed above, this research is motivated by society's growing desire to ensure the sustainability of agriculture, including environmental and socio-economic considerations relevant to the adoption (or non-adoption) of beneficial management practices. The clients for this project recognize that it is this latter concern – and particularly the social or behavioural component – that has been missing from much previous research in Alberta-based agricultural studies. To address this research gap, our investigation employed a rural sociological framework to integrate key social, cultural, demographic, behavioural, economic or financial, and political factors that affect adoption of *both* conservation and food safety beneficial management practices. Three aspects have guided our approach:

1) Looking at conservation and food safety beneficial management practices together. Conservation and food safety beneficial management practices have been treated in this research as distinct yet interrelated components. Beneficial management practices have often been thought of as relevant to 'on-farm' agricultural practices. However, food safety aspects of production, processing, packaging, storage, and distribution are equally as important, given that these practices directly affect both environmental and human health. A genuine need exists to look at these components as two sides of the same coin.

2) Hearing the producer's side of the story. This research is meant to provide producers a chance to communicate their side of what's preventing or encouraging them to adopt beneficial management practices. Since some producers may feel somewhat set upon by public and private agencies, as well as by consumers, this research has been designed to offer them ample opportunity to express their views to the researchers. Moreover, to plan for a sustainable agriculture, it is imperative that all parties have a chance to communicate, and that all parties understand as well as possible what each other means when speaking of sustainability, nature, the environment, conservation, and food safety.

[1] For one good exception from Saskatchewan, see Abaidoo and Dickinson 2002.

3) Extension is a key component to sharing understanding. The funding partners for this research hope to improve extension efforts with the knowledge gained to ensure that they are providing the right information to the right people in the right way. In other words, a strong commitment exists to effectively communicate (and hopefully achieve) better extension practices in the field and elsewhere.

Who is this research for? This research is directly aimed at extension agents in Alberta. The 'social needs' of food producers and associated implications for extension in Alberta have shaped and steered this research from start to finish. It is the extension agent that needs to acquire a better understanding of these complex issues to be able to formulate appropriate responses in working with producers and consumers.

1.2 RESEARCH QUESTIONS

By gathering and highlighting available knowledge regarding key *social* barriers to the adoption of conservation and food safety beneficial management practices by Alberta's producers, and exploring the ways in which extension practices affect these factors, this research achieves an important outcome: an improved understanding of these issues for policy makers and extension deliverers in the agricultural arena. Specifically, this project explores the key motivators and barriers of Albertan farmers and landowners and how these influence (or could influence) the adoption of conservation and food safety beneficial management practices. The two main questions for this research were:

1) Social Needs: What are the social needs that affect the adoption of conservation practices and food safety beneficial management practices by producers; and

2) Extension Protocols: How does an understanding of the social needs of producers affect extension and the protocols it should use to promote adoption of conservation and food safety beneficial management practices?

These two questions were further separated into six sub-questions:[2]

Social Needs

1) What are the key sociological motivators and barriers to adopting environmentally responsible and food safety beneficial management practices?
2) How do these motivators and barriers change within and between Alberta's different agriculture communities, where the specific communities of interest are those of commodity, geographic location, and farm direct marketing?
3) Do social needs (sociological motivators and barriers) change throughout the adoption process (i.e., awareness, interest, understanding, trial, adaptation)?

[2] It should be noted that these sub-questions were developed during the proposal stage of this research, and some adaptation was agreed upon with the project team. As a result of the methodologies eventually selected, some limitations in answering certain questions were encountered. These are explained in this report.

Extension Protocols

4) What sociological tools should extension officers use to improve their program delivery?
5) How should these tools be used?
6) How should they be evaluated?

2. LITERATURE REVIEW

The purpose of this literature review is to provide a contextual background for the chosen research methodology and subsequent analysis and discussion. Few studies have identified rural 'sociological' barriers to adoption in Alberta or other parts of Canada. Most of the available literature on the topic has come from the United States and Australia, and to a lesser extent from Europe (e.g., Netherlands) and certain developing countries (e.g., South Africa, Ecuador). If extension is to enhance sustainable practices in agriculture, then improved understanding of the 'social' issues inherent to farming and adoption of environmental technologies is required (Clearfield and Osgood 1986; Pannell et al. 2005; Vanclay 2004). The following sections explore these social issues and highlight key linkages.[3]

2.1 BOURDIEU'S 'HABITUS AND FIELD'

Theory can aid in understanding real life issues by situating actions into an explanatory framework, thus making sense of complex phenomena (Bourdieu 1990). The most common theories for understanding the adoption of conservation technologies include the classic adoption-diffusion model, the behavioural approach, and the actor-network theory (Robinson and Napier 2002; Turrell and McGuffog 1997; Wilson 1997). Bourdieu's theory of 'habitus and field' is less commonly used, but potentially very useful in approaching adoption issues in agriculture. It is highly robust since it allows input from other theories, thus providing a holistic framework to integrate 'practices' with internal and external factors:

> Bourdieu conceptualizes practice as the effect of habitual schemes and dispositions (habitus), combining with resources (capital), all of which are constrained and activated through the structured conditions and arrangements of objects in social space and social time (field) (Carolan 2005, p. 389).

These terms – habitus, capital, field, and practice – are described below.

First, and following Bourdieu's framework, one can imagine 'habitus' as the "residue of past action that functions within the present," giving shape to one's "thoughts, perceptions, and actions" (Carolan 2005, p. 390). Habitus is internal to the actor, and represents the taken-for-granted shared meanings, skills, and behaviours employed by an actor within any given field. Using the game analogy, Bourdieu explains habitus as the "feel or sense of the game" that enables players to play the game (Bourdieu 1990). For example, when we speak we generally do not think about the rules of grammar, but instead act on a sense of what is accepted, and a feel for how sentences should be structured. The same is true in the practice of farming; a farmer engages in countless actions that have become so innate that if forced to explain why or what one was currently engaged in, it might be difficult to verbalize (Carolan 2005). These unconscious schemas are subject to change, however, and can be affected by individual

[3] Note: In accordance with the published research discussed here, we use the term 'conservation practices' in this section, although revert back to our preferred 'conservation and food safety beneficial management practices' throughout the rest of this report.

preferences and abilities. While a given system of farming is shaped by habiti that allow a farmer to work without questioning each action, Bourdieu allows for individual initiative and expression. This means an actor is not entirely bound by the norms of their practice, and each person has the ability to add to, delete from, or revise their behaviour within a given practice:

> Habitus, thus, places action against the horizon of cultural constraints without reducing individuals to 'cultural dopes.' In doing this, Bourdieu leaves habitus open for actor innovation and creativity (Carolan 2005, p. 390).

As for 'capital,' this refers to the resources that are valued in at least one field of the social world, and which an individual has access to in order to make possible his or her actions within his or her field. Economic capital is one well understood form of capital, but less obvious forms include cultural capital, social capital, and symbolic capital. These latter forms of capital refer to the tastes and values and their exchange value within a given field (cultural capital), to the networks that an actor has access to and the resources therein (social capital), or to the status and recognition of an actor (symbolic capital).All may significantly influence an individual's actions, including those of producers. For example, in terms of cultural capital, one can think of the perceptions of the 'right' and the 'wrong' way to farm. Simply knowing the difference between the right and the wrong way to farm in any given agricultural community or group is a valuable resource, or a source of capital. In certain 'fields' of agriculture having a weedy field is considered a sign of a bad farmer. Consideration of this sort of cultural capital can have a powerful influence on how one decides to farm; for example, especially in rental situations, where a farmer doesn't want to sully his or her name (see next section for a more detailed discussion on this topic).

The concept of 'field' as discussed by Bourdieu refers to the area of interest or interaction of a given set of actors. Bourdieu again uses the game analogy to explain this, and defines the 'field' as the game itself.

> The game consists of the set of relations maintained between players as they anticipate and react to the moves of the other players occupying various positions (Raedeke et al. 2003, p. 68).

The field, then, is 'external' in nature (unlike habitus, which is 'internal' to the actor), and can be viewed as a network, or "configuration" of "objective relations between positions" (Raedeke et al. 2003, p. 68). But as Carolan states, unlike games, fields are generally not recognized by those that "play" them, which leads to the "conflict and symbolic violence of social life" as multiple and overlapping fields come into contact, and as actors from within a field, and across different fields, vie for access to resources essential to that field, or those fields (Carolan 2000, p. 391; Raedeke et al. 2003). The field consists of social relations – rather than just individuals or social structures – as well as the resources over which actors compete. These resources are drawn upon to carry out actions, and include economic, social, symbolic, and cultural capital. These fields are neither static nor without consequences: "Struggle over positions within a field impact its structure and corresponding habitus as actors work to either conserve or transform the field" (Raedeke et al. 2003, p. 68). Many different fields exist in the social world, but Bourdieu argues that these fields are not

completely autonomous, and that "power relations within one field may affect an actor's position in another" (Raedeke et al. 2003, p 69). The idea that different fields exist within agriculture is supported by work by Howden and Vanclay (2000) that sought to explore different farming styles in Australia. The authors found that when farmers described styles other than their own, they did so in a disparaging way, applying negative social judgements to the differing styles. Further, farmers self-identified with the more socially desirable styles of farming (Howden and Vanclay 2000).

It is important to note that capital is 'field' specific, which means that what is valuable in one social field such as farming might not be valuable in another social field such as the field of politics. This means that capital only has value when others recognize its value. And, when a certain form of capital is recognized within a social field, it is invariably misconstrued as being of a 'natural' value – or, in other words, one easily forgets that what is valued in one's field might not be valuable in another (Carolan 2005).

Bourdieu contends that by looking at a specific 'practice,' which combines the field and habitus of an actor, "one can begin to understand a social group and its operating logic" (Raedeke et al. 2003, p. 69). In terms of the adoption of conservation and food safety beneficial management practices, Bourdieu's theory of habitus and field aids in understanding adoption behaviour by shedding light on the fact that farming is made up of multiple fields that overlap but which are distinct (e.g., organic agriculture vs. conventional agriculture), and that the fields of agriculture themselves overlap with other non-agricultural fields, all of which are engaged in competition and conflict for economic, social, cultural and symbolic resources. This reality dictates that extensionists and researchers need tools to better understand the unique rules and values inherent to each field, as well as an understanding of the specific nature of the resources that are called upon to carry out needed actions in these fields.

Farmers in any given field of agriculture function in their practice through habiti, or unconscious behaviours and 'rules of the game' inherent to their system of agriculture. As a result, asking a farmer to adopt new practices might require that the farmer first re-visit the rationale behind many actions that are already entrenched in, or innate to, his or her practices. Revisiting innate knowledge and behaviours is a barrier in itself, but if overcome, the new knowledge or behaviour might prove contrary to the very 'rules of the game' that he or she has always worked with. This is something that could prove difficult for the farmer to accept, and could serve as another significant barrier to adoption. Questions of economic, cultural, social, and symbolic capital should also be considered by those proposing new practices to farmers, since these forms of capital represent the resources that farmers draw upon as a means to action in their practice. If any of these are threatened by the new practice, adoption may be difficult for the farmer. All of these points of reference, then, as highlighted by Bourdieu's 'habitus and field' theory, will be further explained below by specifying those variables that function in the adoption process.

2.2 FACTORS AFFECTING THE ADOPTION OF CONSERVATION AND FOOD SAFETY BENEFICIAL MANAGEMENT PRACTICES

Many researchers have investigated the factors that affect the adoption (or non-adoption) of conservation and food safety beneficial management practices in agriculture (e.g., Clearfield and Osgood 1986; Habron 2004; Pannell et al. 2005; Traore et al. 1998; Turrell et al. 1997; Valdivia 2005). Among the myriad variables that have been shown to play an important role in terms of the adoption (or non-adoption) of conservation technologies by farmers and landowners, two systems of functional categorization seem the most useful for facilitating understanding.

The first is based on work by Clearfield and Osgood (1986), who propose four main categories of variables that affect adoption: 1) socio-psychological (which includes beliefs or attitudes); 2) farm structural; 3) ecological; and, 4) institutional variables. Other researchers have used systems or models that give precedence to certain of these variables over others. For example, Rogers and Shoemaker (1971, in Clearfield and Osgood, 1986) and Kim et al. (2005) focus primarily on the socio-psychological variables, whereas Pampel and van Es (1977, in Habron 2004) and Giannakas and Kaplan (2005) concentrate mainly on economic variables. Taking into consideration the bulk of the research on adoption, however, it is apparent that the more inclusive system proposed by Clearfield and Osgood (1986) is necessary for a fuller understanding of farmer behaviour (Warriner and Moul 1992; Pannell et al. 2005; Vanclay 2004). This is also in keeping with Bourdieu's understanding of capital (or resources) used by actors in a given practice, as explained above (Bourdieu 1990). Previous extension efforts often employed a socio-psychological approach to reach the individual farmer at a level he or she could understand. However, this approach has generally failed because each farmer is situated within a 'social' environment. Various overlapping, complementary, and competing contexts influence farmer's decisions to adopt a given technology. These contexts may be family, community, regional, national, and even international. To understand the complexity of farming and adoption issues, an expanded socio-psychological model would incorporate farmer's attitudes and values along with social, environmental, economic, and technological considerations (Clearfield and Osgood 1986; Pannell et al. 2005; Vanclay 2004).

A second system for understanding and discussing the adoption of conservation and food safety beneficial management practices in agriculture is that proposed by Pannell et al. (2005), who suggest that adoption will depend on: 1) the process of learning and experience; 2) social, cultural and personal influences; and, 3) attributes of the practice (or technology) being considered.

While the categories proposed by Pannell et al. (2005) and Clearfield and Osgood (1986) largely overlap, and are effectively referring to the same drivers, the addition of 'technological' attributes as an important area of consideration to adoption is noteworthy. The fact that Pannell et al. draw particular attention to the process of learning and experience as a key component to adoption is also a significant distinction. As such, both frameworks will be used for this report. It is also worthwhile to note that despite the 20 years of research that separates these works, the factors being raised as integral to adoption have not changed. This speaks to a certain level of consensus and lends support to the validity of the factors

considered in this report. Moreover, many other researchers support these categories of variables. Wejnert (2002), for instance, refers to the factors affecting adoption as the characteristics of the innovation, the characteristics of the innovators, and the environmental context in which the innovation is situated (cited in Habron 2004, p. 109). As explained below, however, despite widespread agreement among many social scientists to the importance of these variables, the question of how they work in any given instance remains difficult to predict (Habron 2004), with mainly undetermined cause-and-effect relationships, and perhaps even harder to prioritize.

2.2.1 Socio-psychological Variables

This group of variables – socio-psychological - is what Pannell et al. (2005) refer to as the social, cultural, and personal influences on adoption. This category includes socio-demographic characteristics, such as education level, age, gender, and income, among others. It also includes farmers' attitudes and perceptions, which could touch, for example, on the risk-aversion or risk-taking nature of a given individual, as well as his or her attitude towards government involvement, or towards the idea of stewardship (Baerenklau 2005; Clearfield and Osgood 1986; Marra et al. 2003; Salamon et al. 1997). After extensive research on these variables since at least the 1960s, it is apparent that demographic factors show mixed success in predicting innovation adoption (Habron 2004). A few examples of contrasting results in this line of research are provided here:

> Age - Some say that older farmers are less likely to adopt conservation and food safety beneficial management practices (Kim et al. 2005; Rahelizatovo and Gillespie 2004), while others have shown the opposite (McBeth and Foster 1994, in Habron 2004). While more research seems to support the contention that adoption of conservation decreases with age, there is enough contradictory research to suggest that this depends on the context and technology in question (Clearfield and Osgood 1986; Pannell et al. 2005; Vanclay 2004).
>
> Education - Extensive research shows that farmers with higher levels of education are more likely than farmers with less education to adopt conservation and food safety beneficial management practices (Clearfield and Osgood 1986; Habron 2004; Pannell et al. 2005). However, some studies have shown the opposite to be true (McBeth and Foster 1994, in Habron 2004; Pannell et al. 2005; Vanclay 2004).
>
> Gender and Families - Both gender and 'families that farm together' are other variables that often show a positive relationship to the likelihood of adopting conservation practices, but contradictions to the general rule can be found (Habron 2004).

In Habron's own study, the explanatory variables of "young age, college education, positive environmental attitudes, recent immigration, large farm size, and frequent interactions with change agents did not apply in the three study areas" (2004, p. 114). By way of explanation, Habron suggests:

> Perhaps this indicates the lack of predictability of these factors, the lack of rigorous and consistent research design in the existing study and previous studies (Lockeretz 1990) or the uniqueness of the study area; but, perhaps it reflects the limitations of the traditional adoption-diffusion models suggesting that other theories and concepts such as actor-network theory (Coughenour 2003) that focus on the context and dynamics of information flow and influence are needed as an important complement to adoption-diffusion theory as a way to better understand farmer conservation behavior (2004, p. 115).

In other words, while the socio-psychological variables seem to play a role, the variability of results in the literature likely suggest that a fuller understanding of adoption behaviour requires a bigger picture, or a more robust model or theory.

2.2.2 Farm Structural Variables

Farm structural variables include such factors as the size of the operation, net income/farm sales debt levels, tenure, and farm specialization/diversification (Clearfield and Osgood 1986). Overlap can be found between some of these variables and the above socio-psychological variables. It is often difficult to separate the farmer from the farm.

Most studies agree that larger farms in terms of size, productivity, and/or income are more likely to adopt conservation practices (Clearfield and Osgood 1986; Pannell et al. 2005; Tavernier and Tolomeo 2004; Tweeten 1995). As farm size and income level increase and debt ratio decreases, generally, the likelihood of adoption increases (Habron 2004; Kim et al. 2005). Farms with a lower debt ratio tend to adopt conservation technologies more readily due to greater economic capacity (Featherstone and Goodwin 1993; Rahelizatovo and Gillespie 2004), something Vanclay summarizes by saying “it’s hard to be green when you’re in the red” (2004, p. 214). Only a handful of studies suggest the contrary (Christianson and Arcury 1992, as referenced in Habron 2004; Valdivia and Poulos 2005).

Some exceptions exist, however. One study found that larger farms were more likely to over-fertilize than smaller farms (Supalla et al. 1995). The authors suggest that this was due to the lower levels of environmental concern among the larger farms in their sample, as well as a consequence of technological and time issues. For example, adjusting N application rates between fields might seem too troublesome for large farmers pressed for time, and with a low level of environmental concern (Supalla et al. 1995).

Renting vs. Owning

Research has consistently shown that the likelihood of adopting a conservation practice will be affected by whether a farmer owns or leases the land (Carolan 2005; Fraser 2004; Soule et al. 2000). Still, research that distinguishes between cash-renters and share-renters finds the differences are fewer or absent in terms of adoption rates between share-renters and owners (Carolan 2005; Soule et al. 2000). The reasons for less adoption by land-renters, or tenants, seem more complicated than is typically assumed. Against the standard understanding that tenants have less incentive to plan in the long-term for land that they do not have any stake

in, Carolan found that 50% of the renters surveyed were interested in conservation practices, but were leery of breaching the subject with landlords for fear of "rocking the boat" (2005, p. 396). Since land is becoming increasingly scarce in some regions, some renters are afraid of losing rental opportunities by introducing what might be perceived as more risk to their enterprise, or by suggesting practices that might seem out of the ordinary to some landowners (Carolan 2005).

Bourdieu would refer to this reluctance to rock the boat as an innate awareness of the importance of the cultural capital inherent to one's field – those tastes and values that dictate the 'acceptable' and 'unacceptable' in a given field (1990). For example, because some conservation practices result in weedy fields, as a result of reduced applications of chemical inputs, farmers run the risk of developing a bad name as a result of their conservation efforts. This can be difficult enough to bear for an owner, but as a renter this can prove especially difficult (Carolan 2005; Salamon et al. 1997; Soule et al. 2000).

Salamon et al. cite the example of one farm couple that agreed: "the weed problem costs [them] possible rental opportunities" (1997, p. 269). The wife was particularly nervous that weedy fields reflected poorly on her husband's farming skills:

> Last year everything he did backfired with his weed control program … I think it keeps him from getting more ground … [L]andlords don't like to see the weeds (p. 269).

Carolan suggests that a reluctance to discuss alternative management strategies might indicate a lack of trust between landlords and tenants, an issue which he suggests has grown in production agriculture as "tenants and landlords increasingly find themselves distanced from each other" (2005, p. 396). This distancing can be the result of geography - for instance, the growing trend of landlord absenteeism - but it can also result from social and cultural distancing such as the distance between female landlords/male tenants, older landlords/younger tenants, and other such scenarios (Carolan 2005). Carolan found that self-censorship in terms of discussing conservation issues did not emanate only from the tenant but in a few cases also from the landlord. In these instances, the landlord expressed reluctance in breaching conservation issues with potential renters for fear that a good tenant would be scared away. This issue was exacerbated with female landlords dealing with male tenants, and suggests at what level this factor can be a complex one. This also highlights how models that focus on only one class of variables could easily miss the complexity inherent to the question of conservation adoption, since despite the fact that we are currently discussing the influence of farm structural variables, it is necessary to address the role of trust, a variable that would fit more easily into the socio-psychological category.

Carolan suggests that:

> The reduction of such trust could thus be of significant consequence to the types of relationships that are forged between landlords and tenants (e.g., instrumental vs. communicative), which, in turn, could be of consequence to the type of farm practices that are ultimately adopted (2005, p. 396).

He provides an interview excerpt to illustrate his point:

> We talked a little about things like ridge-till and chemical application in one of our first meetings. I guess he thought I was trying to get at something because he immediately asked, "You're not one of those organic farmers—are you?" And he didn't mean it as a compliment. Right then and there I knew that I better just do what he wanted if I wanted to make this relationship work. (Male tenant, age 43, 600 acres rented, Carolan 2005, p. 396.)

Family Factors

Another factor related to ownership, or farm structure, is family participation in the farm operation (Clearfield and Osgood 1986; Pannell et al. 2005). Families that share common aspirations regarding the future of the farm tend to adopt conservation practices more readily than other farms (Clearfield and Osgood 1986; Salamon et al. 1997). Family size seems to affect the number of conservation practices that a farm will adopt, as does the degree to which spouses share in farm decisions and the degree to which families share in information gathering (Clearfield and Osgood 1986).

Salamon et al. (1997) suggest that researchers attempting to uncover barriers to adoption of conservation practices need to consider issues other than just profitability, and would do well to include more complex variables in their research, such as family factors. In their study of 60 Illinois farm families – 30 'conventional' farms and 30 'sustainable' farms – they found, for example, that a lack of family consensus could be a social barrier to adoption. In particular:

> Wives whose farm background included a father role model dedicated to conventional farming systems were critical of a husband's management. Typically, weedy fields were a bone of contention for sustainable couples (Salamon et al. 1997, p. 269).

They quote one wife frustrated by her husband's sustainable practices:

> [My dad] never tolerated weeds … I guess I feel about weeds like having them in a garden; they don't belong … Either [my husband] does something about it, or I will … I don't care if it's 2,4D or Roundup, I'll use anything, it doesn't bother me (Salamon et al. 1997, p. 269).

Salamon et al. (1997) suggest that 'conventional farm families,' characterized by prudence, experimentation, and disliking chemicals (characteristics typical of 'sustainable farming families'), are likely most open to sustainable systems (outside of those already in sustainable farming systems). They further state that those families that fit the ideal form of the conventional farm family are unlikely to make a dramatic shift in their management practices since the conventional families "reject what sustainable adopters value" (Salamon et al. 1997, p. 271). As seen with the wife whose father was dedicated to conventional farming systems,

current family factors are not the only way that family influences can affect adoption. The role of family tradition and history can also be a significant factor for those engaged in sustainable farming vs. conventional farming (Salamon et al. 1997). For example, 60% of 'sustainable' farm families (as opposed to 48% for the 'conventional' farm families) reported a kin-mentor to be crucial to how they farmed. The kin-mentor relationship was different between sustainable and conventional farm families in that the 'sustainables' referred to a role model who had a reputation of being "the earliest adopter of environmentally sensitive practices" (Salamon et al. 1997, p. 268). The sustainable farming families expressed great pride about their history of sustainable farming practices, just as conventional farming families expressing pride at being the early adopters of new equipment, a fact that speaks to the importance family can play in the likelihood of conservation adoption. It also raises questions of worldview and belief systems.

Based on their research of these family factors, Salamon et al. (1997) challenge the accepted wisdom that a transition to sustainable farming systems will require a fundamental paradigm shift regarding attitudes and beliefs in regards to nature and the environment. They conclude, instead, that adoption or non-adoption of conservation practices will conform to a family's existing worldview rather than challenge it. In other words, sustainable farming families continue to practice those values embedded in their family history (or at least in one family member's history); they don't adopt practices that require a fundamental shift in worldview.

This entrenchment of beliefs and values is well explained by Bourdieu's theory of habitus and field, which suggests that actors in any given field (such as farming, in this scenario) are bound on the one hand by rules of the game that are internalized by the actor, but which are likely unspoken rules, or which are situated below the level of everyday consciousness, but which very much dictate how that actor perceives 'good practice.' These rules, and how well the actor abides by them, greatly influence what resources are available to the actor. In other words, farmers located in one particular 'field' of agriculture (such as sustainable or conventional agriculture) are likely entrenched to a significant degree by a host of factors that may or may not be evident. The farmer still has the capacity to change his or her actions, but those proposing such changes need to be aware of the field he or she is situated in, and the set of rules by which he or she functions (Bourdieu 1990; Carolan 2005).

2.2.3 Ecological Variables

The importance of ecological (or biophysical) variables rests not only with the presence of ecological degradation (such as soil erosion), but also on the 'perception' of such degradation (Clearfield and Osgood 1986).

> Perception of a problem is a necessary but not sufficient condition for the adoption of conservation practices (Clearfield and Osgood 1986, p. 12).

Research has shown a tendency for the 'proximity effect.' For example, this means that farmers and landowners are more likely to identify erosion as a problem somewhere other than on their own farm. (Clearfield and Osgood 1986; Kington and Pannell 2003; Pannell 1996). Bultena et al. (1984) found that farmers "are most likely to identify erosion as a

problem in their county, are somewhat less likely to identify it as a problem in their community, and are even less likely to identify it as a problem on their own farm" (cited in Clearfield and Osgood 1986, p. 12). This could be because: 1) they don't have an erosion problem on their farm; 2) their erosion, or the magnitude of it, may be difficult to recognize since not all erosion is easily recognizable; or 3) there is a denial of the problem as a means to reduce the psychological stress of a sense of failure to deal with it (Clearfield and Osgood 1986).

Dryland salinity has been used to illustrate how the difficulty of observing or understanding an environmental problem can lower perception of a problem and thereby reduce adoption of practices to combat the problem (Pannell 2001; Pannell et al. 2005). Likewise, if an environmental issue is a long-term issue, then the practice to ameliorate the degradation is likely to be a long-term remedy – both of these reduce the ability of farmers to perceive fully the severity of the problem and the effectiveness of the practice. This also has implications in terms of profitability since these sorts of practices will likely have up-front costs with long-term returns on investment – returns that might not be financial (Vanclay 2004). This issue of profitability will be discussed in more detail below.

Some research suggests that if farmers are aware that they are at risk due to environmental degradation, they are more likely to take action to mitigate the environmental degradation (Vanclay 1992, Rickson et al. 1987 (both in Vanclay 2004)). However, perception of degradation can be further complicated by certain extension, conservation, and media reports and campaigns that "depict land degradation in its most dramatic forms: deep erosion gullies, salt encrusted pans, or exposed tree roots resulting from wind erosion" (Vanclay 2004, p. 219). Vanclay argues that these efforts might be counter-productive:

> While farmers are made aware of the issue, they do not see the same degree of degradation occurring on their own farm and consequently believe they do not have a problem. They will claim this even when it is known that the problem may be serious in their own locality. Where farmers do experience land degradation in such a severe form, they may feel powerless to address the problem, and adopt a fatalistic attitude rather than undertake any reclamation action or fundamentally change their management practices (Vanclay 2004, p. 219).

This certainly speaks to the importance of having reliable (i.e., scientific) environmental knowledge of degradation issues. Above all, this applies for less observable and more difficult problems, as well as effective extension to help raise perception of the issue in the lives of farmers. This is not simply at serious or crisis stages, but also at earlier and less serious levels. Reliable information is needed so as not to instil a sense of hopelessness in farmers that the problem is too large to effectively manage.

Certain ecological variables are difficult to separate completely from farm structural variables. For example, the biophysical realities of sustainable agriculture are inextricably bound with certain farm structural and management arrangements. These can act as a constraint against the easy incorporation of such sustainable practices into more conventional

farming systems. In other words, the biophysical needs of sustainable agriculture and the structural and management outlook that this requires might not fit with the structural and management arrangements of conventional agriculture. As Carolan explains:

> Sustainable agriculture, for instance, remains wedded to such long-term farm management strategies as building up soil fertility without the use of chemicals, developing an integrated pest management strategy, and expanding crop rotations to include multi-year phases. These strategies are resistant to short-term economic rationalities precisely because they take time to implement (2005, p. 398).

Carolan (2005) goes on to explain that reductions in chemical inputs might slightly decrease yields "as soil structure, beneficial micro-organisms, and the overall fertility of the soil rebuilds itself" (p. 398). This can act as a barrier to adoption due to the structural constraints of current agriculture that makes each season an important one, with little room (if any) for reduced yields or lower productivity due to a reduction in chemical use. Such an ecological reality, then, is wedded closely to farm structural arrangements.

2.2.4 Institutional Variables

Other important variables for the adoption of beneficial management practices are considered as 'institutional,' or public and private agencies along with their respective policies or programs. Clearfield and Osgood contend that institutional variables are among the most influential variables affecting adoption of conservation practices, and yet are the least defined, the most difficult to document, and the least researched" (1986, p. 13). They also assert that "institutional factors may have the greatest impact on adoption and use of conservation practices" (p. 13). For example, while research has shown that conservation agencies are frequently referenced as "likely sources of needed conservation information, there exists confusion about the types of assistance available from individual agencies" (Clearfield and Osgood 1986, p. 13). Despite the fact that considerable research suggests that the higher number of institutional contacts a farmer has, the likelier he or she will be to adopt conservation practices, the general trend in extension today is to have fewer and fewer agency contacts in favour of a more centralized, and less expensive, system of information pooling (Clearfield and Osgood 1986; Toma and Bouma Management Consultants 2004; Vanclay 2004).

Clearfield and Osgood (1986) found a gap in the research literature regarding the influence of institutional effects, but acknowledged a growing sentiment that the 'market and infrastructure perspective' to innovation diffusion would be the most fruitful. This is a perspective based on the market approach, which emphasizes the use of information and technical and financial assistance; in effect, a combination of market principles and the classic adoption-diffusion model. This perspective is premised on the assumption that "individual behaviour does not represent free will so much as choices within a constraint set and that it is government and private institutions which establish and control the constraints" (Clearfield and Osgood 1986, p. 15). At the time, it was assumed that the process would function in three fairly straightforward stages: "1) establishment of diffusion agencies

through which the innovation is distributed to the population at large, 2) implementation of an agency strategy to induce adoption, and 3) adoption of the innovation" (p. 15). However, in practice, this process is considerably more complicated.

Early research had already shown that farmers needed to be viewed as "segmented rather than mass audiences"; that information and technical assistance needed to focus on sub-groups based on their common needs, characteristics, stages in decision-making, etc.; and, that a knowledge of these new clienteles, including information about their needs, values, information sources, etc. would be crucial to successful diffusion strategies. While much of this line of reasoning is still accepted today, new research both supports and questions the above claims. Pannell et al. (2005), for example, discuss the role of extension and how this has changed over the last 20 years; namely, from a relationship that saw extension staff primarily concerned with aiding farmers meet their own goals to today's environment where extension staff are often concerned with helping farmers find ways to meet the goals of society (e.g., the adoption of improved environmental management practices).

Institutional implications of adoption include considerations stemming from the research stage right through to extension and diffusion of conservation practices. For example, considering the myriad factors that affect farmers' adoption of any given practice or technology, researchers should strive to achieve the desired environmental goals, while also meeting the farmers' goals. These include proposing technologies that will have high relative advantage and trialability. Pannell et al. (2005) suggest that if researchers do not have a conservation practice that can achieve all of these needs, the practice will likely not be adopted at sufficient levels. Hence, time and effort might be better used in attempting to create a practice or technology that will be adopted as opposed to attempting to sell farmers on a practice that only reaches some goals (i.e., the environmental goals over the farmers' goals).

Other researchers have argued that research supported by government and agri-business is already greatly influenced by political and financial interests, some of which may not favour the environment and/or the farmer (Hall 1998; Morgan and Murdoch 2000; Silva 2003). For example, Hall (1998) contends that the level of institutional support for reduced tillage over other conservation measures such as organic farming illustrates to what level agri-business and political interests can affect the course of conservation extension. Likewise, Silva (2003) asserts that the paucity of funding for biological pest control compared to funding for genetically-modified organisms illustrates how agri-business interests trump conservation, farmer, and scientific interests. The likelihood that research and extension into conservation practices is affected by political and agri-business interests should raise certain questions, such as: 1) are political and agri-business interests being put before conservation and farmer interests; 2) if so, how does this affect the quality of the conservation measures being proposed (i.e., are they as effective as they could or should be?); and, 3) are these interests consistent or inconsistent with conservation and farmer interests (i.e., if conservation and farmer interests overlap with political and/or agri-business interests, perhaps the system still functions adequately)?

Answers to these questions will vary depending on the context and characteristics of each environmental issue being addressed and the conservation measure being proposed. For example, in terms of reduced tillage, Tweeten (1995) contends that its adoption has been so high because it succeeds in meeting all four possible criteria of a successful innovation; namely, supportive economic, technological, institutional, and human resource factors. He argues that conservation practices distinguished by favourable conditions in these four areas will achieve high rates of adoption. This is consistent with the recommendation by Pannell et al. (2005) to design innovations that can meet farmers' goals as well as environmental goals. The question remains, however, whether the possibility of meeting these goals is complicated by the potential influence of the goals of other stakeholders, such as agri-business, departmental or other political goals that may or may not differ with the environmental and farmers' goals being pursued.

Moreover, as many different types of farmers exist as there are different types of habitats, if not more, which means that generalizations are difficult to support. It is likely that in some cases these goals are in conflict, whereas they converge in others (Carolan 2005; Pannell et al. 2005; Vanclay 2004). It seems, then, that the successful production and diffusion of beneficial management practices will be those that mitigate conflicting goals, or at least marshal them into an innovation that can predominantly meet the goals of farmers and the environment. This also includes others such as agri-business or public institutions.

Institutional factors could also play a significant role in the success of a conservation practice in the goals of extension staff. For example, the traditional view of extension was a system of one-way communication, wherein the extension agency was the communicator of information and the farmer was the 'passive' receiver of this information (Vanclay 2004). This model has changed significantly, although hints of its influence still linger (Pannell et al. 2005; Vanclay 2004). Specifically, there is a tendency to overlook the fact that farmers are in fact 'active' pursuers of information, and that they are subject to a wide diversity of information through a diversity of information channels (Pannell et al. 2005; Vanclay 2004). In such an overwhelming environment of information overload, extension should focus on issues of credibility, reliability, legitimacy, and the decision-making process of farmers (Pannell et al. 2005, p. 14). Features of current conservation-related extension that reduce its development of credibility can also include short-term funding, rapid turnover of staff, the youthfulness and inexperience of many staff, and the lack of technical farming expertise of many staff (Pannell et al. 2005, p. 14). The perception of acceptable adoption rates depends on the expectations that extension holds for itself. This is not to say that extension should set its sights low in order to succeed every time, but instead that a reappraisal of extension's goals might be warranted (Pannell et al. 2005). Suggestions for extension will be discussed in the next section.

2.2.5 Technological Attributes

Consideration of adoption behaviour should consider the attributes of the technology or practice being proposed to farmers (Pannell et al. 2005; Vanclay 2004). Technologies that have a high relative advantage and a high level of trialability are the most likely to be adopted. Likewise, those innovations which do not improve a farmer's practice and which

are difficult to trial, or are difficult to observe and assess the effectiveness of, are the least likely to be adopted (Pannell et al. 2005). The relative advantage of a technology or practice refers to how it is perceived by farmers in terms of how much better the new technology or practice is compared to the current one. Pannell et al. assert:

> Relative advantage depends on the landholder's unique set of goals and the biophysical, economic and social context where the innovation will be used. Relative advantage is the decisive factor determining the ultimate level of adoption of most innovations in the long run (2005, p. 8).

The authors elaborate on a number of economic, social, and environmental factors that will dictate the relative advantage of an innovation, such as:

- the short-term input costs, yields and output prices of the innovation
- the innovation's impact on profits in the medium- to long-term
- the innovation's impacts on other parts of the whole-farm system
- adjustment costs involved in adoption of the innovation
- the innovation's impacts on the riskiness of production
- the innovation's compatibility with a landholder's existing set of technologies and resources
- the innovation's complexity
- government policies
- the cost or profitability of the traditional practice which the innovation would replace
- the compatibility of the innovation with existing beliefs and values
- the impact of the innovation upon the family lifestyle
- self-image and brand loyalty
- the perceived environmental credibility of the practice (2005, p. 9-10)

They conclude:

> Among those farmers with a focus on profit, the farm-level economics of the conservation technologies will be most important. Those conservation technologies that are not profitable at the farm level will tend to be adopted only by farmers with stronger conservation goals. The lower the perceived profitability, the stronger the conservation goals need to be for adoption to occur. Unprofitable conservation technologies are likely to be more widely adopted if they are able to generate conservation benefits when adopted at a small scale. Conservation land uses that require adoption at large scale to generate conservation benefits will probably not be adopted sufficiently if they are perceived to be less profitable than the land uses they replace (Pannell et al. 2005, p. 10).

Trialability refers primarily to the physical attributes or characteristics of a technology. This includes the divisibility of a technology (which can aid in small-scale adoption or trialling of a technology), the observability of its effectiveness, complexity, trialling costs, similarity to

past practices, etc. Pannell et al. (2005) contend that innovations which are easy to trial for a farmer are more likely to adopted, since few or no farmers will adopt a practice they have not had personal experience with on their farm.

While many of the points broached by Pannell et al. in terms of technological attributes have already been discussed under the heading of other variables in this section, it is worthwhile to consider these same variables from the point of view of the technology in question, rather than simply discussing them as isolated phenomena. Remembering that it is ultimately the new technology that is being questioned, then, it is easy to see how other variables (e.g., personal, cultural, social, and economic factors) interact with this proposed innovation. As well, along with its objectives and perceived characteristics, decision-making process and the likelihood of adoption or non-adoption of the technology should be defined.

2.2.6 Process of Learning and Experience

Pannell et al. (2005) also draw out the process of learning and experience, which is another way of addressing 'ways of knowing' or 'knowledge systems' as discussed by Morgan and Murdoch (2000), Murdoch and Clark (1994), and Murdoch and Miele (1999). The point here being that the way farmers 'learn' and 'know' (or acquire knowledge) will also play an important role in how they respond to a new technology or practice.

Morgan and Murdoch (2000) contend that the evolution of agriculture from the end of the Second World War to the agriculture of today required the adoption of a new knowledge system. Traditionally, farmers relied on 'tacit knowledge': a more local and particular knowledge that allowed farmers to manage for their particular conditions. With the industrialization of agriculture and the increasing use of chemical inputs for weed and pest control, farmers moved from drawing on their traditionally tacit knowledge systems to developing the standardized knowledge system that was required in the new industrialized farming. Tacit knowledge is "often personal and context-dependent" knowledge that is easily communicated in person through shared experience and interaction (Morgan and Murdoch 2000, p. 160). Tacit knowledge can be simplified as, "we can know more than we can tell" (Morgan and Murdoch 2000, p. 160). Standardized knowledge however, is 'codified' knowledge that is explicit and easily transferable (Morgan and Murdoch 2000). The authors argue:

> For instance, before the availability of herbicides, weed populations were kept under control through the use of crop rotations so that no one weed species could benefit from a consistently favourable environment. By the late 1940s, arable farmers had generally reached a high level of weed control using rotations … (Morgan and Murdoch 2000, p. 164).

By the 1960s, herbicides were being used on a considerable scale, allowing farmers to "grow a succession of crops without using either rotations or traditional techniques such as ploughing" (Morgan and Murdoch 2000, p. 164). Rotation became considered 'old-fashioned' and was left behind by many as an obsolete practice.

> Rotations and ploughing were no longer the main means of fighting weeds and pests; chemicals now filled that role. And the application of chemicals need not be attuned to local circumstances; simple instructions about application were all that were needed. Thus the tacit knowledge which had been established from farm to farm, whereby the farmer used his or her intimate knowledge of the land, acquired over generations, gave way to the standardized, codified knowledge accompanying chemical sprays (Morgan and Murdoch 2000, p. 165).

The concern this raises is that switching back will likely prove more difficult than assumed. As the conventional agricultural model is increasingly criticized and questioned for its impacts on the environment and rural communities, demands are being made for changes towards more sustainable farming practices. Morgan and Murdoch suggest:

> Farmers are not particularly well placed to effect such changes. They have become dependent upon external, standardised, codified forms of knowledge and have lost many of the traditional local, ecosystem-sensitive forms of knowledge which might have served them well in a new agricultural era (2000, p. 166).

It is not simply an issue of lack of knowledge, but also of being familiar with an entirely different way of knowing. The authors suggest that if a conventional farmer were to switch to organic farming, an important step would be one of 'creative forgetting':

> Organics represents a radical discontinuity with the past, an almost complete break with the knowledge networks of the productivist paradigm….The organic conversion process requires innovators to *forget* much of the knowledge they have acquired in intensive production (Morgan and Murdoch 2000, p. 167).

The authors argue, "the role of forgetting in the development of new knowledge has been underestimated," and:

> The enormous power of habits of thought … constitutes a permanent risk for blocking potentially fertile learning processes. It may be argued that some kind of 'creative destruction of knowledge' is necessary before radical innovations can diffuse throughout the economy (Johnson 1992, cited in Morgan and Murdoch 2000, p. 167).

Such 'forgetting' would need to be accompanied by the acquisition of new knowledge; not an easy task given that the focus of research and development in the innovation sector for agriculture is premised on and dictated by the industrial food chain. What further compounds this problem is that organics were not "developed by the scientific establishment and disseminated through extension services" – the typical channel of innovation diffusion – but instead "developed by ecologically committed practitioners, and later examined by the scientific establishment" (Morgan and Murdoch 2000, p. 167). This means that the formal

knowledge system has lagged far behind organic practice. The authors conclude: "Not surprisingly, researchers have found that lack of knowledge is one of the key barriers to organic conversion among farmers" (p. 167). They do warn, however, that lack of knowledge is only one of many barriers to organic conversion. They refer also to the cultural and institutional challenges that have contributed to this knowledge deficit, such as the fact that both in a community context as well as in a formal, institutional context, organic farming was for a long time considered marginal, an alternative lifestyle, and even subversive.

> In other words, the knowledge deficit needs to be understood as an effect of the systemic bias against organic farming, a bias which ranged from the formal organs of the state to informal, but no less important, peer pressure from intensive farmers at the local level (Morgan and Murdoch 2000, p. 167).

The authors suggest that this likely explains why some of the early innovators in organics have been well-educated people with urban backgrounds - people with less farming experience, and with many of their social contacts outside of the local farming community, which would make local disapproval easier to accept.

2.2.7 Diversity of Variables

As the above examples demonstrate, those variables affecting adoption – namely, the socio-psychological, farm structural, ecological, institutional, technological, and learning variables – do not work in isolation but through complicated interactions that confound the ability of social scientists to predict adoption. The diversity of research and findings into issues of adoption has shown that measurement issues are of great concern. For example, the inability of social science to successfully predict adoption behaviour might be a result of the 'types of measures' chosen to study the issue, as well as 'how' those measures are used:

> It is quite possible that use of single item indicators of conservation adoption behavior, such as assessment of specific conservation practices, may have introduced so much measurement error that theoretical models developed for testing may have not been appropriately evaluated (Napier et al. 2000, p. 123).

One suggestion to "at least partially control for [this] measurement error" is the creation of a composite measure index of conservation adoption behaviours (Napier et al. 2000, p. 124). While these authors are referring specifically to conservation measures used to test factors of adoption (the observed phenomenon, or the dependent variables), it is just as likely that the explanatory factors chosen (or the independent variables) also affect the success of a study.

The preceding studies illustrate how complex conservation adoption can be. Such studies often begin with the goal of investigating how one or few factors affect adoption, and end by acknowledging that other factors undoubtedly need to be considered (Warriner and Moul 1992; Wilson 1997). Wilson (1997), for example, set out to investigate farmers' motivations for participation in an environmental program. His research was grounded in a behavioural approach that attempted to test participation rates against specific factors. While he obtained some success, he also noted:

> [T]he study also highlights that a behavioural approach has limitations. For example, the discussion has highlighted that the situation is highly complex and that factor independence is not always guaranteed… Thus, separate analyses of individual factors may be misleading in some cases, as the decision of whether or not to adopt a scheme may be a culmination of various, often interrelated, factors (Wilson 1997, p. 89).

Weeds can be an indication of poor management for many conventional farmers, while this is less of an issue with farmers using more sustainable practices (Salamon et al. 1997). Salamon et al. (1997) suggest that this difference in attitudes towards weeds, and the construction of the meaning of weeds, is fundamentally a question of values, beliefs, and worldview. While one's worldview would most likely fit within the socio-psychological category of variables, the interaction between this variable and structural variables is interesting. While one's worldview would certainly affect how one structures his or her farm, it is also possible that one's farm structure could have entrenched certain cultural practices and beliefs that then re-enforce the structure. Abaidoo and Dickinson (2002) support this line of reasoning in their study of conventional and alternative farmers in southwest Saskatchewan, and Bourdieu's (1990) theory of habitus and field explains this as overlapping but distinct fields of practice, each with its own set of unwritten rules and accepted behaviours.

As the use of chemical inputs became more common between the 1950s and the 1970s, the ability to suppress weeds was significantly improved (Morgan and Murdoch 2000). As agriculture was restructured, then, farmers' perceptions of weeds changed. This has had consequences on how they structure their farms, how they judge the quality of other farms, and on alternative farming practices, with potentially serious implications for the ability of extension to successfully sell its alternative practices.

Furthermore, even if issues of perception could be overcome (and farmers from a conventional farming worldview began to accept the idea that weeds don't necessarily mean poor farming practices), technical and knowledge limitations will still exist that their farming structure has imposed on them (Morgan and Murdoch 2000). This, too, will prove a barrier to adoption since a lack of technical ability increases risk and discourages trialling and adoption (Flett et al. 2004; Morgan and Murdoch 2000; Pannell et al. 2005). In other words, the restructuring of farming not only changed the attitudes and beliefs of farmers, but it also drastically changed their knowledge base, and the type of knowledge they are comfortable, or even capable, of using (Morgan and Murdoch 2000; Murdoch and Miele 1999). This serves as another example, then, of how these variables function not in exclusivity but in complex interaction with each other.

2.2.8 Summary

In summary, it is useful to consider farming and ranching as a social field that function with the aid of its own unwritten rules (habitus), accepted behaviours (beliefs and attitudes), and value systems (capital). Furthermore, multiple fields or types of production exist, and rules and values may differ within each of these. Where these varying fields of agriculture come into contact, different levels of social conflict occur as various actors vie for resources (such as status, respect, knowledge, economic capital, access to markets, etc.).

For the adoption of conservation and food safety beneficial management practices, then, it is important to understand the unwritten and often unconscious ways of knowing and thinking that underlie a producer's practice. Depending on the agricultural field(s) being investigated, preferences and values will differ from other fields as will the types of networks and how these function, and the criteria used for bestowing status on those producer who are deemed exemplary (Bourdieu 1990; Carolan 2005). This theoretical framework is useful for situating the practice of farming in a 'social' context. By further categorizing variables that contribute to adoption, this explanatory framework becomes more practical.

The frameworks of Clearfield and Osgood (1986) and Pannell et al. (2005) have been used to more precisely investigate variables that influence the adoption of conservation and food safety beneficial management practices in agriculture. Clearfield and Osgood (1986) assert that socio-psychological, farm structural, ecological and institutional variables will all play an important role in the adoption of a beneficial management practice. Pannell et al. (2005) contend that the process of learning and experience; social, cultural, and personal influences; and attributes of the technology (or practice) being proposed will all influence rates of adoption by producers.

Key socio-psychological variables (or the social, cultural and personal influences faced by producers) affecting adoption behaviour include the attitudes, beliefs, age, education, and gender of the producer. Farm structure, the type, size, productivity, and income of a farm, as well as its debt ratio, can also play a significant role in the adoption or non-adoption of beneficial management practices.

Ecological variables include the biophysical and agronomic characteristics of any given operation, and can include consideration of whether or not the conservation and food safety beneficial management practice in question deals with an environmental issue that is relevant to a particular producer, or easily observed on that producer's land. Ecological variables also include consideration of the environmental issue being discussed and whether it is a topic that is easily understandable and observable, or if it is a long-term process that extends beyond the easy comprehension and relevance of one's day-to-day life.

Institutional variables include consideration of the role government and agri-business play in the research and development of beneficial management practices, as well as how these affect the types of practices chosen for extension, and how this extension is carried out (or by whom). Institutional variables can also include consideration into the policies that encourage or discourage adoption of conservation or food safety technologies, as well as consideration

into the interplay between different policy from different eras, departments, and levels of government, and how all of these interact with each other.

Technological variables include consideration into the relative advantage and trialability of the conservation or food safety beneficial management practice in question. This includes questions as to what the practice can do to benefit the producer and his or her operation, as well as how easily the producer can trial the practice and observe its impact.

Learning and experiential variables are also important factors, and intimately bound with one's way of knowing. Conventional agriculture is premised on the use of standardized, codified knowledge while more sustainable forms of agriculture call for the use of tacit knowledge. Likely a significant barrier to the adoption of some conservation measures will be due to challenges that producers face in overcoming these issues of knowing. Separating variables into distinct categories aids in discussion, but it is important to acknowledge the complex interaction that exists between all of these variables in real life. It is here that Bourdieu's theory of practice becomes valuable, allowing researchers to take the components of adoption and place them together into a framework that allows for greater explanation.

The next section will deal more specifically with the second question that is driving this research, namely: How does this understanding of the social barriers and motivators of producers affect extension and its protocols to promote adoption of conservation and food safety beneficial management practices?

2.3 EXTENSION

A current trend worldwide is the privatization of agricultural extension services (Marsh and Pannell 2000; Baker 1987). This is a move away from a predominantly public sector extension system to a mix of private and public sector extension, or in some cases, a completely private sector system of extension (Toma and Bouma Management Consultants 2004). This trend is related to factors such as the declining relative importance of agriculture in the economy, budget pressures on governments, and the increasing influence of economists' theories and prescriptions within government (Marsh and Pannell 2000, p. 606). Further, as agriculture has become increasingly industrialized and specialized, the type of information required by producers is of the sort that is often better handled by the specialized knowledge of the private industry that has created or patented the technology in question (Marsh and Pannell 2000). Policy changes include decentralization, implementation of user-pays schemes, "the instigation of cost-recovery mechanisms, cost sharing and participation of stakeholders in development of initiatives and in other decisions that affect them" (Marsh and Pannell 2000, p. 606).

According to Marsh and Pannell, both advantages and disadvantages can be listed on the shifting roles of extension. On the one hand, by allowing the private sector to play a role in the 'extension market,' public funds are now "freed up to focus on areas where the market is more likely to fail" (2000, p. 623). As well, the authors applaud many of the advantages to the group-based extension that has now become the norm in Australia. In terms of disadvantages, however, the authors raise concerns about an over-dependence on group-

based extension. They are also concerned about a weakening link between research and extension; researchers and producers are losing contact and there is less feedback from private sector extension to public sector research. All this is in the context of Australian extension, but there is likely to be some similar issues arising in other countries that are experiencing similar shifts.

Black (2000), also speaking from the Australian context, examines in detail the four major strategies or models of agricultural extension: linear 'top-down' transfer of technology; participatory 'bottom-up' approaches; one-to-one advice or information exchange; and, formal or structured education and training. The author concludes that no single strategy should be chosen to the exclusion of the others, but rather that an extension system based on contributions from all these should be supported.

Traditionally, extension was based primarily on the linear 'top-down' transfer of technology. More specifically, it was typically understood or instrumentalized using the adoption-diffusion model, which focused extension activities on producers thought to be the 'early adopters,' with the expectation that once they had embraced a new practice their example would be followed by others (Black 2000). While this model has been shown to function in certain cases, such as with "the use of tractors, hybrid seed and synthetic fertilizers," other instances have occurred where the adoption-diffusion model was not useful in explaining adoption behaviour (Black 2000, p. 494). The adoption-diffusion model seems most appropriate with those single-item technologies that are relatively straightforward, and which increase productivity. With more complex and "integrated suites of practices," however, such as those involved in integrated pest management, the effectiveness of this approach is less certain (Black 2000, p. 494). Likewise, technologies that increase productivity are different than those "whose primary merit is that they are more sustainable and environmentally benign" (Black 2000, p. 494).

Many participatory approaches to technology transfer have also been suggested in response to criticisms of the top-down approach. Some participatory researchers work with farmers primarily to gather information, who then develop solutions to be offered back to farmers; other approaches may "emphasize community empowerment and are based on the assumption that farmers themselves have the ability to develop economically viable and ecologically sustainable farming systems" (Black 2000, p. 494).

Advantages of these bottom-up approaches include the recognition of local ways of knowing and experience. In other words, they are supportive of local innovation and adaptation; can allow for diversity and complexity, enhance local capabilities, and allow for local involvement in the development of policy that will ultimately affect their own communities; and encourage ownership of the technology by the producers who will be using them (Black 2000). Some disadvantages include new problems (such as complex environmental issues) might not be adequately served by local knowledge that is based on past experience; tend to overlook the diversity in rural communities and farming circles, and thus are poorly prepared for the diverging perspectives and conflicts that arise out of some participatory processes; prejudice, ignorance, and entrenched power structures can hinder meaningful production of

new ideas and solutions; not all producers enjoy participatory processes; and, too many group-based approaches can take a toll on producers (Black 2000).

> In short, while participatory and group-based approaches to agricultural extension have various advantages when they are well implemented, they should not be regarded as the one and only strategy that can or should be used to facilitate the adoption of sustainable farming systems. Belief in a 'participation fix' may be just as naïve as belief in a 'technology fix' (Black 2000, p. 496).

Black suggests that the top-down and bottom-up approaches can be viewed as the opposite extremes on a continuum of extension options. Borrowing from Campbell and Junor (1992), he also suggests that as situations become more complex, "emphasis should increasingly be placed on empowering people and groups to engage in on-going processes of experimentation, learning and human development" (Black 2000, p. 496). He continues:

> This does not mean that technical know-how and technology transfer are necessarily displaced as situations become more complex; rather, existing technical know-how is built upon—as well as being evaluated and potentially contributed to—as the spectrum moves toward empowerment of individuals… (p. 496).

In other words, as the technology or the environmental issue in question becomes more complex, an empowered producer base becomes more valuable in terms of successful implementation and on-going use of the proposed technology.

Black situates the one-to-one model and formal or structured education and training between the top-down and bottom-up approach, with the former found nearer to the traditional adoption-diffusion model of extension, and the latter closer to the group empowerment model. Black echoes Marsh and Pannell (2000) by stating that the trend in agricultural extension is away from the traditionally public sector one-to-one technology transfer to more group-based approaches. He suggests that the economic rationalist perspective would argue that since one-to-one technical or financial advice is a private good, the recipient should pay the cost, but that environmental issues and advice confound this rationale since many problems have a "diffuse environmental impact beyond the individual farm" (Black 2000, p. 497). As noted that as public sector one-to-one advice has declined, a marked growth in the private sector consulting industry has occurred.

Black cites two recent studies in Australia which show that "over 70% of farmers rated their accountant as an extremely or fairly important source of advice for their farm business," with retailers, merchandisers and stock and station agents; advisers employed by seed, fertiliser or chemical companies; and Department of Agriculture staff being other groups that were indicated as being important sources of information (2000, p. 498). In terms of formal or structured education and training, Black notes that while Australian farmers are more educated than in the past, they remain consistently less educated than the general labour force. While attitudes may be changing, most Australian farmers remain reluctant to

undertake formal, long-term educational courses as offered by universities. He explains this reluctance as being a result of:

> (i) A lack of time, especially when they cannot afford to employ additional farm labour; (ii) a questioning of the relevance of tertiary courses to farming; (iii) a belief that the competencies required for farming are essentially practical, whereas formal courses tend to be more theoretical in emphasis; (iv) a lack of awareness of the courses available; (v) a lack of confidence by farmers in their ability to undertake the study required, especially when it is many years since they finished their formal education; and (vi) prevailing attitudes in rural communities to the respective roles of men and women (Black 2000, p. 498).

Producers do tend to take courses that deal directly with farm issues, however, especially if they take no more than a few hours or days of their time. Bamberry et al. (1997, cited in Black 2000) summarize producers' preferences for the content, approach, and delivery of such programs:

> *content* – meeting specific needs for knowledge and skills relevant to current and future developments, including learning skills; *approach* – short, modularized courses encouraging participation, project-based learning, developing competencies, practical, measurable outcomes; *delivery* – flexibility to accommodate seasonal work demands, home study plus local support where possible, provision for some social interaction (p. 498).

Some other relevant considerations from the research by Bamberry et al. (1997) include the following:

1. Farmers generally need to be assured of the relevance and benefits of a program before they will commit themselves to it;
2. The learning process is often triggered by a desire to solve a particular problem, pursue opportunities, or implement change;
3. Modularisation allows farmers to choose those modules that are of interest to them;
4. Watching, listening, asking questions and doing are generally preferred to reading;
5. Hands-on learning is preferred by most;
6. Social interaction during learning may be an important incentive for joining, and it can also facilitate the learning process itself; and,
7. Farmers usually prefer not to be graded formally, but instead value the skills successfully learned, and possibly the opportunity to gain credentials or certifications (as referenced in Black 2000, p. 499).

2.4 IMPLICATIONS FOR RESEARCH AND EXTENSION

2.4.1 Research

In their review of the adoption literature, Pannell et al. (2005) provide a series of suggestions for researchers developing conservation technologies and practices. Above all, they contend that researchers need to take heed of the type of technologies that producers adopt most readily. If researchers consider producer goals and needs from the outset – that is, at the stage when practices and technologies are being developed – they will have a better chance of finding adoptable practices. Consequently, not only environmental goals that inspired the technological development will be met, but they will also help achieve producers' goals.

Pannell et al. (2005) note that technologies that have a high relative advantage (i.e., they are better than the technology that came before, or they benefit the producer in his or her practice) and that have high trialability (i.e., so the relative advantage can be easily tested and observed) will be those technologies that are adopted most readily. The authors also suggest that the use of participatory processes can be beneficial in that it forces researchers and extension staff to recognize that "their own goals may be different to landholders' goals" (Pannell et al. 2005, p. 13). Recognizing conflicting goals early in the process allows for the possibility of overcoming this barrier to adoption, which otherwise might go unrecognized entirely; or, in some cases, it may be recognized too late such as when the technology is already being proposed on the 'extension market.' As mentioned above, participatory processes also increase ownership in new practices and technologies, as well as contribute to these practices by incorporating valuable local, experiential knowledge of producers. Working with social scientists from an early stage in research development can aid in better understanding producers' values and goals, as well as understanding how the decision-making process contributes to the adoption of beneficial management practices.

2.4.2 Extension

Pannell et al. (2005) support the criticism of traditional extension that viewed its role as simply a matter of communication. Formerly, if practices weren't adopted at desired rates, extensionists considered this failure a result of poor communication, and so focused energies on improving the methods of information delivery. Pannell et al. (2005) suggest that the false assumption in this perspective is that producers exist in an information-deprived environment, becoming passive receivers of information, when in reality producers are active seekers of information. The problem is that they are situated in an environment bombarded with information coming from many different sources and in many different formats. Under such circumstances, the authors suggest that extension, especially extension that deals with conservation practices, needs to concern itself with issues of "credibility, reliability, legitimacy, and the decision-making process" (Pannell et al. 2005, p. 14). They further suggest that current conservation-related extension that confounds credibility might include short-term funding, rapid turnover of staff, and the lack of technical farming expertise or young age of many staff.

Pannell et al. (2005) also borrow from Vanclay (2004) and suggest that the goals of extension might warrant reappraisal. Specifically, it may not be realistic to suppose that extension will be able to convince large numbers of producers to change their management practices; at least, not solely based on recommendations by extensionists. Instead, extension should: 1) realize that they do not have automatic legitimacy and credibility; and, 2) consider that its role might be better conceived as accelerating the rate of adoption as opposed to lifting the final level of adoption. An exception to the latter might be in those instances where technologies would have "entirely failed to diffuse in the absence of extension, perhaps due to problems with trialability (e.g., low observability, high complexity) (Pannell et al. 2005, p. 14).

The authors also suggest that extension would do well to note that a "key determinant of an adviser's credibility to a farmer [is] trust" (p. 14). Further, trust is built between a producer and an adviser when it is felt that the adviser understands and respects the goals of the producer:

> Trust determines the nature of the role that an adviser may play in the social aspects of the decision-making process of the landholder. Without trust, an adviser may only expect to participate as a provider of information that will be later evaluated within a closer circle of trusted contacts (Pannell et al. 2005, p. 14).

While trust is a valuable commodity for an adviser, it is slow in the earning and can be "easily lost by the support of an innovation or practice clearly unsuited to local circumstances" (Pannell et al. 2005, p. 15), or through the fervent support of practices that are in opposition to the goals of the majority of landowners. As an elaboration on this theme, Pannell et al. speak to the drastic changes in extension that have occurred over the last 20 years, where extension has come to focus its efforts on encouraging producers to make decisions that benefit the public good (e.g., in terms of adopting environmental improvements), as opposed to the past focus of extension, which was to encourage the producer to make good decisions to achieve individual goals. This shift in the focus of extension can have significant consequences for how producers view extension agents, and the level of trust they have in them (Pannell et al. 2005).

Lastly, the authors also suggest that extension use multiple approaches, and not focus its energies on only one format such as the internet or group-based extension. They state:

> One advantage of using multiple approaches is that it increases the chances of reaching more of the relevant groups of farmers. Secondly, different farmers have different learning styles and prefer to receive information in different ways, or through different channels (Bardsley 1982). Thirdly, repetition can help to reinforce a message and build confidence, especially if it comes through different channels and from different sources (Pannell et al. 2005, p. 14).

3. METHODOLOGY

A mixed-methods approach was utilized for this project for two reasons: the complex nature of the questions being addressed, and the diverse nature of the respondents and participants. The questions posed were multi-faceted. Not only did we want to understand the motivators and barriers affecting the adoption of beneficial management practices by producers; we also wanted to compare these perspectives against those of the extensionists that work to increase adoption.

The fieldwork was conducted in three partially overlapping phases: a face-to-face survey of producers (see Appendix 2 for the questionnaire), two focus groups with two distinct populations of producers (see Appendix 3) and farm direct marketers (see Appendix 4), and key informant interviews with extensionists (see Appendix 5). Each will be discussed in detail below. A map has been included (Figure 1) that shows where the surveys and focus groups were held in Alberta from early March to early May.

3.1 FACE-TO-FACE SURVEY

A face-to-face survey methodology was decided upon due to the limitations of accessing a reliable, up-to-date list of producers from which to draw a sample. Also, as agreed upon with the project team during the study plan preparations, our intention was not to have a statistically representative sample. This was unrealistic given the project budget and time constraints. Instead, we elected to sample the diversity of opinions on a 'face-to-face' basis from three selected regions in Alberta – North, Central, and South.

3.1.1 Sample

The sample was drawn from the population using a systemized methodology and maps to randomize the selection of producers in the desired counties. Using topographical maps, every 20th household was selected to participate in the study. If nobody was home or if the producer did not wish to participate, the next immediate household was selected, and so on, until a survey was successfully completed. Only those at least 18 years of age who were considered to be a household member were interviewed.

Once producers were randomly selected using the county maps, they were contacted in person and asked to participate in the project. If they agreed to participate, the survey was either completed immediately, or a time was set-up when the survey could be conducted. All surveys (except two from St. Paul) were conducted with an Alberta Research Council researcher present.

We also intended to leave additional survey copies for those interested in passing the survey on to friends or family, with the understanding that these would be self-administered and mailed back to Alberta Research Council when completed, and treated as a separate survey 'pool.' This only occurred once during the project, however. Efforts were taken to ensure that a relatively representative sample was selected, accounting for diversity in terms of gender,

age, and farm operation type. In the end, with two surveys received by mail from the St. Paul area (North), we conducted a total of 64 surveys.

3.1.2 Location

The five regions that were sampled in this project for household surveys were:

- Forty Mile (irrigated)
- Special Areas #2 and Acadia (non-irrigated)
- Ponoka
- Peace Country

These counties were chosen for their diversity of farming/ranching situations, providing the project with a good representation of the Albertan farming/ranching context in four distinct yet representative areas. Other considerations that went into the selection of these counties included travel time, existing contacts, and client recommendations.

The two counties in southern Alberta differed in that Forty Mile is largely an irrigated landscape, whereas Special Areas #2 is mostly non-irrigated. Ponoka County differed from these southern counties in terms of precipitation, history, and intensity of management. Ponoka is also situated on the Highway 2 corridor, which made this county unique.

The Peace Country is situated in the northwestern region of the province, representing a different context for investigation in terms of climate, ecology, and access. For example, the occurrence of different wildlife issues, and a shorter growing season were thought to have the potential to play an important role in land management decisions in the north that would differ significantly from southern Alberta. Further, the dominance of the forestry and oil and gas industries in northern Alberta contrasted with the agricultural prevalence in the south. It was thought this could also have the potential to affect the decision-making process in terms of conservation and food safety beneficial management practices.

3.2 DATA ANALYSIS

All statistical analyses were done using SAS version 9.1 for Windows. Different dependent variables (those factors that are predicted or caused by something) and independent variables (those factors that predict or cause something) were used.[4] Along with 55 dependent factors, 6 independent factors were considered in the statistical analysis: *age*, *education*, *annual gross farm income*, *producer type*, *worldview*, and *farm type.* This resulted in 55x6=330 pairwise relationships to be statistically evaluated. Fisher's exact test was used to evaluate the relationships between categorical parameters with the exception of parameters that were

[4] Note: The dependent variable is not under the experimenter's control. It is the variable that is observed and measured in response to the independent variable. For example, the independent variable 'age' might affect a dependent variable such as one's 'preferred source of extension information' (radio, Call Centre, workshop, etc.).

ordinal in nature, which were analyzed using Cochran-Mantel-Haenszel's row mean score statistic. Since the number of years of farming was normally distributed, a one-way Analysis of Variance procedure was used to examine the relationship between the number of years spent farming with age, education, income, producer type, worldview, and farm type. Since the number of acres farmed was not normally distributed, the Kruskal-Wallis non-parametric procedure was used to evaluate the relationship between the number of acres farmed and age, education, income, producer type, worldview, and farm type.

Qualitative data were subjected to a series of categorizations based on themes, with themes starting at a level very specific and later becoming more general and inclusive. The intent with this categorization was to ensure that all themes raised by participants were acknowledged, and if necessary or possible, linked with other related themes and topic areas. Producers were categorized based on the type of practices they followed and/or their disposition to the current standard practices of agriculture; specifically, those utilizing chemicals in their practice were categorized as conventional, those abstaining from chemical use were categorized as alternative, and those who communicated a practice that was based on maximizing efficiency, and who showed their level of status through the immaculate state of their yards, their driveways and through the use of high-tech equipment and techniques, were categorized as status producers. Worldview categories were based on producers' responses to the worldview scale (for more details see the Worldview section in Chapter 4).

3.3 FOCUS GROUPS

Two focus groups were conducted as a means of verifying data gathered from the face-to-face survey, as well as to gather information not easily collected through survey methodology. The focus groups provided a comparison tool with which to evaluate the effectiveness of other methodological tools used in this project. It was also hoped that 'lessons learned' through conducting the focus groups would allow us to evaluate the effectiveness of this methodological tool for addressing questions of adoption in agriculture (focus group transcripts submitted under separate document as part of deliverables).

3.3.1 Focus Group #1: St. Paul

The first focus group gathered randomly selected producers in the St. Paul area on April 26 to discuss some key topic areas from the survey: 1) information sources; 2) farming and conservation; and, 3) social considerations. Although we were getting into the start of the seeding season and most farmers were busy working in the fields, we felt that an evening session with a meal would hopefully make it a bit easier for anyone who was interested in the subject matter to attend. Our expectation was to have from 8-12 participants. Honorariums were provided to all participants ($100/person), and the focus group was preceded by a meal.

Phoning participants for this focus group began on April 20. Since the project team wanted the participants to be randomly selected from the county of St. Paul, a random number generator was used to select a township, range, section, and ¼ section, and then the county map was referenced to see if a farm household existed in that location. Nonetheless, this

method failed to provide a satisfactory number of households. After approximately 200 attempts, the ¼ section approach was eliminated. The new rule was that if more than one household was found in a section, the ¼ sections were examined in clockwise order starting in the northeast. Three hundred and eighty sets of random numbers were generated to identify a list of 136 households.

Approximately four person-days were spent in identifying households and phoning potential participants for the focus group. Many of those called were not home; in these cases, a message was left identifying the project partners and the topic of the focus group, with a contact name and number to call back if anyone was interested in participating. Our initial intent was to invite people from different farm operation types, divided between those who owned or leased land. When it became apparent that it was going to be quite difficult to get the minimum number of people to participate, less emphasis was spent on stratifying the group. One person wanted to come with her spouse, but we insisted that only one member per household could attend; this woman ended up attending by herself. Another goal was to encourage a significant number of women to participate, which, whether by design or luck, ended up being the case: *six of the eight participants were women*. With the help of the facilitator for this focus group, one person was identified who was eager to not only participate in the focus group, but who also provided other names of potential participants. In the end, four of the eight participants in the focus group came because they were specifically identified by other people.

In addition to the sub-contacted 'external' facilitator, the St. Paul session was attended by an Alberta Research Council researcher who provided a brief project overview at the beginning of the session and helped with questions and discussion. The focus group was audiotaped and later transcribed, using notes from the session to follow who was speaking. All participants expressed their widespread satisfaction with the session afterwards, and we continued to discuss related issues with some of them until 10:15 p.m.

3.3.2 Focus Group #2: Fairview

The second focus group, held in Fairview (Peace River area) on May 5, was intended to address issues of food safety beneficial management practices. The logistics and facilitation for this focus group were conducted by the staff at the Rural Business and Diversification Branch and Food Safety Division. Staff from this department phoned an existing list of members of the Agri-Food Learning Network, a group of people involved in issues dealing with farm direct marketing and food safety issues. This allowed us to work with an existing group of direct marketing practitioners, already comfortable discussing food safety issues with each other, to contribute to a better understanding of the key issues addressed in our survey. In addition to the facilitator, the Fairview session was attended by an Alberta Research Council researcher who provided a brief project overview at the beginning of the session and helped with questions and discussion.

Honorariums were provided to all participants ($100/person), and the focus group was preceded by a meal. All potential participants were informed of the research partners involved in this project, as well as the honorarium and meal that would be provided for

participants. This focus group was conducted from 12:00-2:30 p.m., with the meal starting at 11:15 a.m. A total of eight farm direct producers participated: six women and two men.

3.4 KEY INFORMANTS

Interviews were held with 'key informants,' those considered experts in the topic areas of adoption and/or extension dealing specifically with conservation and food safety beneficial management practices. These experts were mainly found in governmental organizations that focus on agriculture, and particularly on adoption of environmentally sustainable and safe practices. Interviews were intended to increase understanding in terms of relevant issues elicited during the farm household survey, and to provide 'lessons learned' as a means to evaluate this type of interview as a methodological tool for use by extensionists. Key informant interviews were also intended to provide a critical lens through which data collected by other project methodologies could be assessed.

3.4.1 Logistics

The project team provided Alberta Research Council with a list of potential contact names, with phone numbers and/or emails of those individuals considered expert in the field of extension and sustainable agriculture. It was intended that 10-12 interviews were to be conducted by phone or face-to-face using an adaptable guide to structure the questions. If feasible and permission granted, the interviews were digitally recorded and typed into a transcript (Word document) to facilitate comparative analysis (interview transcripts submitted under separate document as part of deliverables).

3.5 PROJECT COMMUNICATION ACTIVITIES

Several additional activities were carried out during this project to provide feedback and for communicating the project research and expected results to a broader audience. Many of these activities led to further outreach with interested individuals and agencies from within Alberta and even outside, including from other prairie provinces. Some key communication components integral to this project are described below.

3.5.1 Project Communication

A Project Communication plan was discussed, prepared, and distributed among all team members in the early stages of this project (see Appendix 6). The purpose was to create readable and engaging communication pieces about this research project: as agreed by the team, "We want our information to have impact. To do this we need to engage our target audience in the current knowledge as well as the new information we are learning. Thus we need to translate the current information to the language of our target audience." It also was agreed upon that regular one-hour meetings would be held every two weeks by conference call, and the face-to-face meetings at the Alberta Research Council would be held about

every four to six weeks.[5] On April 4, a three-hour 'focus group' session with the project team was facilitated by the Alberta Research Council to pre-test the extension interview guide.

3.5.2 QuickPlace

A project team electronic discussion group - QuickPlace - was created on Agriculture, Food and Rural Development's 'Ropin' the Web' website. The main purpose was to stimulate further discussion on key issues related to this project and to generate a project folder. Meeting minutes, research tools, and other documents were placed on QuickPlace from time to time. While useful for increased attention to this project in a private 'workspace,' it was found that at least two team members experienced some technical difficulties in accessing or using QuickPlace. While useful at the beginning, interest in this form of group communication seemed to peter out near the middle of the project.

3.5.3 Project Webpage

A project webpage was designed and posted by Alberta Research Council staff in April called "Rural Sociological Barriers to Adoption."[6]

3.5.4 Radio Interview

The Project Manager was interviewed on the long-running agricultural radio show 'Call of the Land' on April 13 to provide a short synopsis of the project.

3.5.5 News Releases and Short Articles

The Alberta Research Council and the Alberta Environmental Farm Plan Company worked collaboratively to produce a project newsletter (see Appendix 7), and other short articles were written and released to several community and industry media such as the *Western Producer* and *Alberta Farm Express*.

3.5.6 Conference Presentation

Early findings were presented by the Alberta Research Council at the 12th International Symposium on Society and Resource Management (ISSRM), Vancouver, Canada on June 5, 2006. Our presentation was "Barriers and Motivators to Adoption of Environmentally Sustainable and Food Safety Best Practices in Alberta, Canada." The presentation was well received with excellent feedback from an enthusiastic audience.

[5] Face-to-face meetings were held at the Alberta Research Council on December 5, 2005 (proposal discussion), and on February 22, March 30, April 24, and June 16. Conference calls were held on January 23, February 6, March 6, March 20, April 10, May 1, May 15, May 29, and June 16.

[6] See http://www.arc.ab.ca/Index.aspx/ARC/4555.

Another presentation related to this project is being planned for the CAES-FLP-CATPRN workshop, "Crises in Agriculture and Resource Sectors; Analysis of Policy Responses." The Workshop is jointly hosted by the Canadian Agricultural Economics Society, the Farm Level Policy Network, and the Canadian Agricultural Trade Policy Research Network. Our presentation will be "Is Extension the Answer to Avert Agricultural Crisis? Examining Barriers and Motivators to Adoption of Environmentally Sustainable and Food Safety Practices in Alberta for Effective Policy Mechanisms." Our future paper may be selected for publication in the Canadian Journal of Agriculture Economics.

3.5.7 Extension Presentation

On July 24, 2006, the Alberta Research Council delivered a preliminary presentation of the final report to about 30 agricultural extensionists (technicians and team leaders) of the East-Central Region at the Barn Loft Inn near Vegreville. This useful discussion helped obtain early feedback on the nearly completed report. It also gave the researchers and project team some indication of what to focus on for the upcoming October workshop in Calgary with extensionists.

4. FINDINGS

This section has been organized in the following way:

- Farm Household Survey, which includes a summary of the key questions, the significant results from the cross-tabulations analysis, the producer types and worldviews that emerged, the identification of different forms of capital, and the identification of farm structural variables, ecological variables, and institutional variables
- Focus Groups: St Paul, Fairview
- Key Informant Interviews, which defines themes related to extension, themes related to agriculture, and motivators and barriers

Following this section, the discussion will expand on the key findings.

4.1 FARM HOUSEHOLD SURVEY

4.1.1 Summary of Key Questions

In this section, several key questions are examined from the face-to-face farm household survey. Statistical tables have been prepared for all of the quantitative questions and included in Appendix 8. Appendix 9 contains all of the responses to the qualitative or open-ended questions in the survey. It should be noted that due to the small sample size and the qualitative nature of this survey, numbers should be taken with caution. Frequencies and tendencies are provided here to give an impression of how this sample responded to questions, but these tendencies cannot be said to represent the greater population of Alberta producers. They are useful nonetheless for pointing out possible trends.

Demographic Profile of Farm Household Sample

Of the respondents:

- Gender: Most (78%, n=64) were male.
- Age: About half (54%) were aged 36-55, and most (86%) were over 36 years of age (n=64).
- Education: Most (60%, n=63) had at least some college or university education.
- Income: Most (62%, n=53) had a gross annual farm income in 2005 of $100,000 or more; the modal (most frequent) category was $250,000-$499,999, accounting for 26% of the respondents (n=53).
- Location: Most (74%) were from the southern portion of the province, with 12% from the central (12%) and 14% from the north (n=64).
- Farm Type: Nearly half (48%) were mixed, 27% were crop, and 25% were livestock producers (n=64).
- Farm Direct Marketing: Most (80%, n=63) did not practice farm direct marketing.

- Farm Size: Most (53%) were medium-sized farmers with an average of 4,464 acres; overall farm size average was 5,006 acres (n=64).
- Farm Ownership: Almost two-thirds (61%, n=64) farmed land that they did not own.
- Farming Experience: The average number of years spent farming was 27 (n=64).
- Retirement: The average number of years before retiring was 18 (n=64).

Quantitative Questions

Farm Management Decisions. Only 22% (n=64) had a farm management 'team' (e.g., comprised of a boss, accountant, board member, or other 'professional'); of these, most (93%, n=14) had an accountant, banker, and/or financial advisor. A large majority (91%, n=64) stated that other family members contribute to their farm management decisions. Nearly two-thirds had a spouse (64%) that contributed, and 27% had children helping out (n=64). The family member that was considered to have the greatest influence on their farm management decisions was their spouse. Most of those who contributed to farm management decisions either were neutral (47%) or encouraged (37%) the respondent to adopt beneficial management practices (n=62).

Barriers to Adopting Beneficial Management Practices. Almost half (47%, n=58) had heard of certain beneficial management practices but had not yet adopted them for some reason. The top three beneficial management practices not yet adopted were zero-till (38%), solar pumps on dugouts (15%), and organic farming (15%) (n=26). Most had not yet adopted beneficial management practices due to inadequate revenues (64%, n=64), unfavourable market conditions (60%, n=63), proposed conservation practices were unsuitable to their farm situation (55%, n=62), the effectiveness of the proposed beneficial management practice was uncertain (52%, n=64), or financial incentives were lacking (50%, n=62). The next most important barriers were: a perceived lack of personal benefits (31%, n=64), the complexity of the practices and the fact that environmental improvements were not a priority (24%, n=64 and 63, respectively), conservation agencies are not trustworthy (22%, n=63), and family is not supportive of adopting (14%, n=63).

Feelings were mixed on whether the respondent was more likely to adopt conservation practices on land owned rather than rented, although slightly more said 'yes' (51%) compared to 'no' (43%) (n=47).

Information Sources. The five most popular sources of trustworthy information about new farming and food safety practices or innovations were magazines (89%), neighbours (88%), professionals and/or specialists (75%), workshops, field days, and/or tours (72%), and producer groups, clubs, and/or associations (70%). A slight majority used radio, internet, or television. Interesting, only 36% used the coffee shop, church, and/or curling clubs, and 17% used Call Centres for their information (n=64).

'Professionals and/or specialists' or 'workshops, field days and/or tours' were the responses most frequently given by producers when they were asked what they considered their most

trustworthy source of information (19% each, n=62). The second most trustworthy source of information was magazines (17%, n=53), and the third was 'producer groups, clubs and/or associations' (12%, n=33).

Food Safety Best Practices. The sample was almost equally split on whether they thought adopting food safety beneficial management practices would help their farm: 48% said yes, and 52% said no, and this was true both in the short-term (n=64) and long-term (n=60). Some producers felt they did not need to concern themselves with food safety practices because food safety was not an issue with their type of operation.

Qualitative Questions

Farming Situation. People who did not anticipate that a family member would take over their farm after retirement mainly indicated a lack of interest or the difficulty of making money through farming as reasons. The people who answered 'yes' to this question mainly felt there was enough interest from the family to take over, and also that it was a tradition or legacy to keep the farm in the family.

Networks. Many respondents indicated they were members of a church group, a producers association (whether it was hog, beef, milk, grazing), and/or a community type group (including school and hall boards). Other memberships included sports or recreational groups and co-operatives.

According to respondents, a 'good farmer' could be categorized into three groups: those who kept their yards and fields weed-free, had healthy animals and crops, and maintained their farming equipment; those who showed good stewardship for the land; and those who were financially successful. Respondents usually included a mix of these three categories in their answer. Out of 62 respondents, 71% said weed-free yards, healthy animals, etc. were signs of a good farmer, 48% said a good farmer was someone who "cared for the land" or was environmentally conscious, and 22% said a good farmer was able to make a living from farming. A few other people said good farmers were people who contributed to the community, didn't take a short-term view of farming, followed up-to-date practices, and were happy.

As for influences on farming practices, 31% of respondents indicated their father was the greatest influence on the way they farmed, and another 11% said their parents influenced them. Other influences were financial (20%), neighbours (13%), and climate (7%) (n=61).

A majority (76%, n=64) felt that producers who adopt conservation practices were generally well-respected in their community. The most common reasons given for why such producers are mostly well-respected were: it shows they are concerned for the land or the environment, they make bigger profits, and it shows they are thinking about the future. Some people indicated it is the ones who do not adopt conservation practices that are 'talked about' i.e. not respected. People who were unsure or indicated they were not well-respected said it depended on who was adopting the practice or what the practice was. One person felt it was like they were 'grand-standing' to the rest of the community.

Farming and Conservation. When asked whether adopting *conservation practices* would help their farm in the short term, some respondents indicated they had already adopted conservation practices. The most common response was it would help soil conservation. Others mentioned saving money on fuel costs, or being more economical in general. Reasons why adopting conservation practices would not help the farm in the short term included not having the money to do them, or because the climate or political issues have more of an effect on the farm than the practices one chooses. Some of the respondents felt conservation practices would keep the land healthy and result in better productivity in the long term.

When asked whether adopting *food safety best practices* would help their farm in the short term, again, some respondents indicated they had already adopted food safety best practices. Others felt that because consumers and markets demand them, they should adopt these practices. On the negative side, a few people mentioned costs of adoption, or said they didn't need to because their food was already safe enough. In the long term, people cited keeping the consumer happy and being able to market their products as long-term benefits of adopting food safety best practices.

Aside from financial benefits, almost a quarter of respondents (n=39) stated that being able to 'see improvements' would encourage them to adopt conservation practices. They wanted something tangible that was a proven benefit.

There was a fairly even split between people who would and would not adopt conservation practices on land they owned rather than rented. Those who said 'yes' indicated that unless it was a long-term lease and would benefit them, they wouldn't adopt conservation practices on leased land. Those who said 'no' figured if they were already practicing conservation on their own land it wouldn't be a big deal to do it on leased land, and also felt that 'land was land' and it should all be treated equal.

The responses to the question "What is most important to you about being a farmer" could be broken down into three categories: lifestyle (own boss, own schedule, pride, raising family, etc.), nature or environment (being outdoors, animals, love of the land, etc.), and financial. Most people indicated a mixture of these three categories in their answers. Eighty-one percent said the lifestyle was most important to them, 29% said the environment or nature was most important, and 10% said finances were the most important (n=62). Three people specifically said 'feeding the world' was important. A few other people liked the challenge of farming, still saw a future in farming, and enjoyed carrying on the tradition of the family farm.

Information Sources. The most common response for people who did like to experiment on their farms was because they liked the notion of always improving themselves and their operations, and increasing their knowledge. Other reasons for experimenting were just for interest's sake, or to prove to themselves that a practice does work. Half of the people who said they don't like to experiment said it was too costly. Others had no time, or had a system that worked and didn't feel the need to mess with it. Some preferred to watch their neighbours experiment rather than try it themselves.

Seventeen percent of respondents felt that conservation information was already out there for farmers if they wanted to access it; 19% felt the information needed to be promoted better, either on radio, TV, or in magazines; another 17% said holding tours, meetings, demonstrations, etc. would make the information more useful; 11% wanted the information to be tailored to their specific areas or situations or farm types; and 8% said it should be easier to comprehend (n=36). The reasons people felt that conservation information wasn't relevant to their farm or farming situation were because it didn't fit the uniqueness of the area, it was geared to big farms, or that the information was pushing chemicals.

The reasons for why the government should not be promoting conservation practices included the following: farmers are already adopting conservation practices, the government should be promoting markets instead, and the government should only be giving technical or financial assistance to farmers. Reasons the government should be promoting conservation practices include having the resources, access to information, influence, and tools to promote the information, and also in general to help keep the land viable.

Farm Direct Marketing. Of the twelve people who indicated they do practice farm direct marketing, their main reasons for doing so were because they had no other choice for selling their cattle or hay, and that they got better market value for their products. The eight people who responded 'no' indicated they couldn't because of wheat or grain boards, they had never thought of it, they were too old, they lived too far away from the market, etc. All of the people who practiced farm direct marketing and who answered the questions at the back of the survey were involved in production, 60% were involved in marketing, and 20% were involved in processing (n=5). All of the respondents were aware of the steps that need to be taken to ensure safe handling of food on their premises, during transportation and storage, and with regards to personnel, equipment, and storage. Seventy-five percent were aware of the steps at the recall stage (n=4).

Only three people answered the question "For the best practices that you were aware of, please indicate whether you have adopted the practices or not." They had all adopted the best practices for premises and sanitation. Sixty-seven percent had adopted the best practices for the other categories.

Sixty seven percent of people indicated they would adopt food safety practices for each level of the food manufacturing process they are involved in, and 33% indicated they had already adopted them (n=3).

Only one person responded to the question regarding whether or not they had taken any steps in the last 3 years to make the food products they farm direct market safe. They try to feed their animals safely (nothing "artificial") and they have them slaughtered at an inspected plant.

In response to the questions "For the best practices that you were aware of, please indicate whether you have adopted the practices or not, and in a few words explain why or why not", two of the five people indicated they had adopted food safety best practices. One stated they

had their premises certified at the basic level but will go higher, and the other one said simply "it has to be done". The only other categories that were applicable to the first respondent were sanitation ("we do that anyway, as a matter of course") and recall ("we are in contact with the consumer").

When asked whether they would adopt food safety practices for each level of the food manufacturing process that you are involved with, typical responses were: it's a requirement for protecting them and the consumer, they don't want anybody dying, and for economic reasons. Items that would convince people to adopt food safety practices in their farm direct business, at each level of the food manufacturing process were: some financial assistance from the government, input from the people administering the standards, and clearing up the standards and protocols. The only response to the question what is preventing you from adopting food safety best practices was that the producer wasn't at that stage yet.

The benefits that food safety best practices offered their businesses were customer confidence, protecting business, and shipping out good quality products. The benefits to selling directly to the consumer were: direct financial benefit, no middle man, reduction of cost to the consumer, and providing more tailored products for the consumer.

The societal or consumer trends that people felt influenced their farming practices ranged from consumers becoming natural or organic and wanting to know where their products are coming from to producing better quality products to changes in people's eating habits ("everyone is into barbecuing steaks and burgers and nobody buys roasts anymore").

4.1.2 Cross-tabs

Along with the 55 dependent factors, six independent factors were considered in the statistical analysis: *age*, *education*, *annual gross farm income*, *producer type*, *worldview* and *farm type*. This resulted in 55x6=330 pairwise relationships. Only results that were statistically significant (with statistical significance defined by a $p<0.05$) are described here.[7] Due to the small sample size, results of the statistical analysis should be viewed with caution. They are useful nonetheless for pointing out possible trends.

Age, education, annual gross farm income, years spent farming and acres farmed will be included here, while producer type, worldview and farm type will be addressed in separate sections.

Age

There was a significant association between age and …

- the number of years they have been farming ($n=64$, $p<0.0001$)

[7] Note: The words 'felt' or 'agreed' in this analysis refer to 'agree' and 'strongly agree' combined, unless otherwise stated; the same rule applies for 'disagree.'

- the person's opinion regarding the statement "Humans are a part of and subject to nature" (n=64, p=0.0203).
- whether or not the person felt call centres were trustworthy sources of information (n=64, p=0.0206).
- whether or not the person felt the radio was a trustworthy source of information (n=64, p=0.0279).

Few significant differences were found concerning producer age on selected dependent factors. It is to be expected that the age of a farmer will be positively correlated with experience in farming – older farmers have spent more years in the business. The only significant difference on age on the QB11 Likert scale type questions was "Humans are a part of and subject to nature." However, the only ones that disagreed were those aged 36-45, and only 14% disagreed. Still, the analysis showed that **older respondents were more likely to place at least some trust in Call Centres, and trust in the radio for their information needs**. Overall, most producers do not trust call centres. Only 2% of respondents 45 years and under trusted these centres. The age group that trusted call centres the most were the 46-55 year group; still, only 36% indicated they trusted such centres. The older generations also placed more trust in information they received from the radio (e.g., 100% for those 66+ and 75% for those aged 56-65 compared to 45% for those aged 26-45).

Education

There was a significant association between education and …

- the number of years they have been farming (n=64, p=0.0039). The trend is not linear.
- whether or not the person felt that radio was a trustworthy source of information (n=63, p=0.0206).
- whether or not the person felt that television was a trustworthy source of information (n=63, p=0.0194).

Like age, few significant differences were found concerning producer education on selected dependent factors. On education, **producers with less education have spent more time farming**. For example, those with less than a high school diploma have farmed for 39 years on average, whereas those with a university degree have farmed for 17 years on average.
The analysis also showed that **respondents with less education were more likely to trust the radio and television for their information needs**. For example, 83% of those without a high school diploma placed trust in the radio compared to 30% of those with a university degree. Likewise, 100% of those without a high school diploma placed more trust in the television compared to 40% of those with a university degree. However, caution is needed here since this pattern was not consistent when looking at the other levels of education.

Income

There was a significant association between income and …

- whether or not the person had land that they rented or leased rather than farmed (n=52, p=0.0277).
- the person's opinion regarding the statement "current agriculture practices do not harm nature" (n=53, p=0.0166).
- whether the person felt adopting food safety practices will help their farm in the long term (n=49, p=0.0193).
- whether or not the person felt the internet was a trustworthy source of information (n=53, p=0.0490).
- income and the number of years they have been farming (n=53, p=0.0144). The trend is not linear.

Only a few significant differences were found comparing income with selected dependent factors, with some questionable results. For example, **the results are mixed on whether farm income has any effect on beliefs about agricultural practices harming nature**. Most high income producers (60%) with between $500K-1M Annual Gross Farm Income in 2005 felt that current agriculture practices do not harm nature. However, a lot were unsure (43% overall), including those with income over $1M (1 of 2 neutral or unsure, 1 of 2 disagreed). Of those making between $50-99K, 64% disagreed with the statement. On food safety, **those with smaller incomes seemed to have greater faith that adopting food safety practices will help their farm in the long term**. For example, two-thirds (69%) of the $250-499K income group answered 'no' compared to 83% of the $100-249K group answered 'yes.' The only 'trust' variable that showed any significant correlation with income was use of the Internet. **Lower and middle income producers appear to place less trust in the Internet for information than higher income producers** (for example, about two-thirds of those that earned between $50-249K did not trust the internet compared to all of those earning $500K or more who did trust the Internet).

Years Spent Farming

There was a significant relationship between the …

- age of the person and the number of years they have been farming (n=64, p<0.0001).
- education of the person and the number of years they have been farming (n=63, p=0.0039). The trend is not linear.
- income and the number of years they have been farming (n=53, p=0.0144). The trend is not linear.

Except for these three, no other significant differences were found concerning years spent farming on selected dependent factors. It is to be expected that the age of a farmer will be positively correlated with experience in farming – older farmers have spent more years in the

business. On education, producers with less education have spent more time farming. For example, those with less than a high school diploma have farmed for 39 years on average, whereas those with a university degree have farmed for 17 years on average. No significant relationship was found between the number of years spent farming by producer type (p=0.1010), worldview (p=0.3038), or farm type (p=0.2288).

Acres Farmed

- There was a significant relationship between income and the # of acres farmed (n=53, p=0.0039).
- There was a significant relationship between producer type and the # of acres farmed (n=64, p=0.0294).
- There was a significant relationship between worldview and the # of acres farmed (n=64, p=0.0248).

No significant relationship was found between the number of acres farmed with age (p=0.0763), education (p=0.1269), or farm type (p=0.6259).

4.1.3 Worldview

No consensus emerged in worldview, as evidenced by diverging opinions regarding:

- what a healthy environment looks like/consists of (i.e., what 'nature' is)
- what 'conservation' means
- our role in nature
- how we are affecting nature

New Environmental Paradigm

The seven (of 64) respondents who fit into this category agreed with the following statements:

- The balance of nature is very delicate and easily upset
- All plants and animals have value and need protection for their own sake
- Humans are severely abusing the environment
- Humans are a part of and subject to nature
- Nature possesses its own value, independent of human use
- All plants and animals are equally valuable and must be given equal respect and protection

These respondents disagreed with the following statements:

- Humans are separate from and superior to nature

- Nature exists primarily for humans to use
- People just need to accept that growing food takes a certain toll on the environment
- Humans will eventually learn enough about how nature works to be able to control it
- Humans were meant to rule over the rest of nature
- Technology will allow agriculture to remain a viable way of life
- Current agricultural practices do not harm nature

These respondents came from a variety of backgrounds, in terms of their farm structure, age, education level, geographic location (in the province), and size. See Table 1 below for a breakdown of these respondents:

Table 1. Profile of Respondents with New Environmental Paradigm Worldview.

	Age	Education	Farm Size (acres)	Location	Farm Type and Structure
1	46 – 55	High school	5000	South	Certified organic mixed farm
2	66+	High school	1120	South	Mixed farm
3	46 – 55	University	5000+	South	Mixed farm
4	56 – 65	Some college	1760	South	Grain farm– zero tillage
5	36 – 45	College	640	Central	Beef producer
6	66+	Some college	800	Central	Mixed farm / zero tillage
7	36 – 45	University	640	North	Mixed farm – not certified, but they farm organically

Dominant Social Paradigm

Two respondents expressed beliefs consistent with the Dominant Social Paradigm. Respondents expressing the Dominant Social Paradigm agreed with the following statements:

- Current agricultural practices do not harm nature
- Humans were meant to rule over the rest of nature
- Nature was meant for humans to use

They disagreed with the following statements:

- Growing food takes a certain toll on the environment
- Humans are severely abusing the environment

- All plants and animals are equal and deserve respect and protection for their own sake

Mixed New Environmental and Dominant Social Paradigm

Most respondents (55 of 64) communicated a worldview that combined beliefs from the two opposing paradigms. These respondents tended to agree with statements such as:

- Humans are separate from and superior to nature
- The balance of nature is delicate and easily upset
- Humans were meant to rule over the rest of nature
- Humans are severely abusing the environment
- Current agricultural practices do not harm nature

Likewise, they tended to disagree with statements such as:

- All plants and animals have value and deserve protection for their own sake
- Nature has value, independent of human use
- Humans will eventually learn enough to control nature
- Growing food takes a certain toll on the environment

There was a great deal of diversity in responses within this category, given the fact that it contains the vast majority of respondents. For this reason, this category was further divided into those leaning towards the New Environmental Paradigm and those leaning towards the Dominant Social Paradigm, both still staying within the mixed worldview category.

This category breaks down in the following way:

- Middle-New Environmental Paradigm (10 of 55)
- Mixed New Environmental and Dominant Social Paradigm (42 of 55)
- Middle-Dominant Social Paradigm (3 of 55)

The three respondents tending towards the Dominant Social Paradigm (middle-Dominant Social Paradigm) expressed many beliefs consistent with the Dominant Social Paradigm, but responded to certain statements in a contradictory fashion. The same is true for the respondents in the middle-New Environmental Paradigm category, who tended to the New Environmental Paradigm, but had a number of contradictory beliefs that put them in the mixed worldview category.

There was a significant association between worldview and the person's opinion regarding the statement …

- "Humans are separate from and superior to nature" (n=64, p=0.0165).
- "Nature exists primarily for humans to use" (n=64, p=0.0029).
- "Humans are severely abusing the environment" (n=64, p=0.0011).

- "Humans were meant to rule over the rest of nature" (n=64, p=0.0036).
- "Current agriculture practices do not harm nature" (n=64, p=0.0009).
- "All plants and animals are equally valuable and must be given equal respect and protection" (n=60, p=0.0416).

Worldviews were measured using a Likert scale premised after that used by Abaidoo and Dickinson (2002) and Beus and Dunlap (1991) that sought to elicit respondents' beliefs regarding nature, and our role in it. The five worldviews were 1=New Environmental Paradigm, 2=middle-New Environmental Paradigm, 3=mixed New Environmental and Dominant Social Paradigm, 4=middle-Dominant Social Paradigm, 5=Dominant Social Paradigm. Our analysis indicates that **Dominant Social Paradigm and middle-Dominant Social Paradigm producers tend to prioritize humans over nature**. All middle-Dominant Social Paradigm (n=3) and 50% of Dominant Social Paradigm producers (n=2) believe that humans are separate from and superior to nature, compared to 31% of mixed (n=42) and 10% of middle-New Environmental Paradigm producers (n=10) (interestingly, 50% of Dominant Social Paradigm producers (n=2) were neutral or unsure). All middle-Dominant Social Paradigm and Dominant Social Paradigm producers believe that nature exists primarily for humans to use, compared to 14% of mixed and 10% of middle-New Environmental Paradigm producers. Not surprisingly perhaps, both Dominant Social Paradigm producers (and 67% of middle-Dominant Social Paradigm producers) *disagreed* that humans are severely abusing the environment, whereas the reaction was mixed among the mixed group, but 70% of the middle-New Environmental Paradigm group agreed with the statement. Likewise, both Dominant Social Paradigm producers (and 67% of middle- Dominant Social Paradigm producers) *agreed* that humans were meant to rule over the rest of nature. However, in this case, 67% of the mixed group of producers *disagreed*, along with 70% of the middle-New Environmental Paradigm group and 100% of the New Environmental Paradigm producers. Most middle-Dominant Social Paradigm and Dominant Social Paradigm producers agreed (67% and 50% respectively) that current agriculture practices do not harm nature, with the mixed group mainly neutral or unsure (50%).

4.1.4 Producer Types

Three types of respondents emerged from the sample: conventional, alternative and status producers. These producers were recognized by their differing opinions regarding the use of chemicals, and/or their disposition towards standard agricultural practices.

The questionnaire did not test for the adoption of specific beneficial management practices, but it did provide an opportunity for producers to comment on those practices that they wished to address. Conventional producers communicated the use of chemical fertilizers, pesticides, herbicides and/or insecticides, while alternative producers indicated that they avoided the use of chemicals in their operations. The status producers in this sample were also conventional producers.

Conventional Producers

These producers (50 of 64) represented the standard system of practice in agriculture. These producers typically practiced zero (or reduced) tillage and used chemical inputs in their practice. Conventional producers almost always communicated a 'mixed New Environmental and Dominant Social Paradigm' worldview. However, there were four producers (out of 50) who were conventional producers and had beliefs consistent with the New Environmental Paradigm. These four producers expressed a New Environmental Paradigm yet managed their operation in a conventional manner, adhering to the common practices as communicated by other conventional producers in the sample. 10 other producers (of the 50 conventional producers) communicated a 'middle-New Environmental Paradigm', and two producers expressed beliefs consistent with the Dominant Social Paradigm.

Alternative Producers

Eight of 64 producers were alternative producers. All of these producers expressed views that were contrary to those of the majority of their peers. Six of these eight producers expressed their divergence from the norm by abstaining from the use of chemicals in their practice, something which is counter to a more standard practice in agriculture. Two of the alternative producers did use chemicals but at reduced amounts, and with concerns over the effects of doing so. One of the alternative producers strongly disagreed with the tendency to continuous cropping and the move away from cultivating, something that he felt was important to farming, and to keeping grasshopper populations under control.

Two of the alternative producers communicated a worldview in line with the 'mixed New Environmental and Dominant Social Paradigm' category, while the other six communicated a worldview that fell into the New Environmental Paradigm (3) or the 'middle-New Environmental Paradigm' (3) categories.

Status Producers

Six of 64 producers were classified as status producers based on their type of practice, which can best be summarized as 'maximizing efficiency'. These producers communicated an aura of success and affluence through their immaculate yards, many bins, and their overall professionalism.

Of the six status producers, one communicated beliefs consistent with the New Environmental Paradigm, four expressed a 'mixed New Environmental and Dominant Social Paradigm' and one communicated adherence to the Dominant Social Paradigm. See the Discussion for more detail regarding producer types.

There was a significant association between producer type and …

- the person's opinion regarding the statement "Humans are severely abusing the environment" (n=64, p=0.0236).

- the person's opinion regarding the statement "Humans were meant to rule over the rest of nature" (n=64, p=0.0369).
- the person's opinion regarding the statement "Current agriculture practices do not harm nature" (n=64, p=0.0114).
- whether the person felt producers who adopt conservation practices are well-respected in the community (n=64, p<0.0001).
- whether or not the person felt that neighbours were a trustworthy source of information (n=64, p=0.0142).
- whether or not the person felt that workshops were a trustworthy source of information (n=64, p=0.0314).

The three producer types were conventional, alternative, and status. Our analysis indicates that **status producers tend to prioritize humans over nature**. A total of 67% of status producers felt that humans are not severely abusing the environment, compared to a minority of conventional and alternative producers that felt this way (in contrast, 50% of alternative producers *strongly agreed* that humans are severely abusing the environment). About two-thirds (67%) of status producers felt that humans were meant to rule over the rest of nature, whereas 68% of conventional producers and 75% of alternative producers *disagreed*. Half (50%) of the status producers agreed that current agriculture practices do not harm nature, whereas 62% of alternative producers *disagreed*, although a sizeable minority (42%) of conventional producers were neutral or unsure.

Respect and trust are other issues that show some differences among producer types, with alternative producers of the opinion that conservation practitioners are not well-respected in the community, and with greater trust expressed by status producers in structured settings for receiving information. A total of 90% of conventional producers and 67% of status producers felt that those who adopt conservation practices are well-respected in the community, compared to only 12% of alternative producers. Most (94%) conventional producers trust their neighbours for information, which is about 30% higher than either alternative or status producers. Interestingly, all status producers trusted workshops for their information, compared to 74% of conventional producers and 38% of alternative producers.

4.1.5 Forms of Capital

Following Bourdieu's theory of habitus and field, the following forms of capital were identified through the survey process. Table 2 highlights these forms of capital, as well as the producer specific examples identified in this research.

Table 2. Capital Drawn Upon by Producers.

Capital	Producer specific responses
Economic	1. Economic capital is scarce 2. There is a widespread perception that a crisis is imminent, if not already present 3. Specifically, the relationship between input costs and commodity prices is not sustainable
Social	'Alternative farmers' are more likely to 'never' access the known community meeting places
Cultural	1. Zero tillage is now the new 'right way to farm' for the majority, but there is a minority who disagrees 2. Weeds (and their control) retain a high exchange value in terms of cultural capital
Status	1. Zero tillage is one sign of status 2. 'Status' producers maintain their status through other means: their large size; immaculate yards (with large, well-maintained gravel driveways); many bins; and their business-like and efficient way of operating

Economic Capital

All respondents indicated that one's access to economic capital was in jeopardy, and there is an over-whelming sense that a crisis is imminent in agriculture. This crisis is related specifically to the steadily increasing costs of inputs and the shrinking returns on investment, as seen in very low commodity prices. Producers communicated their conviction that this relationship was not sustainable, and if something was not done agriculture would find itself in the midst of a crisis.

Social Capital

Conventional producers were clearly better 'branched in' to their communities' dominant social networks than alternative producers, either through the coffee shop, or any of the other recognized meeting places (such as the curling rink, chemical sales office, church, bar, etc.).

Alternative producers were less likely to access these meeting places, and almost always responded that they 'never' accessed them. Alternative producers consistently indicated their separation from the common social networks in their communities, as well as with the common information and social networks available to most producers (specifically, in terms of government extension services and support). These producers did express their dependence on alternative social networks, but these were networks that they had to locate on their own.

Cultural Capital

The two most prominent forms of cultural capital expressed by the sample were:

- absence of weeds
- utilizing zero or reduced tillage

The new conventional 'right way to farm' is using zero (or at least reduced) tillage practices. One status producer, who had already switched over to zero tillage, put it bluntly:

It is obvious it [zero tillage] is meant to fit all producers, which is unrealistic….For the people on the periphery, like for people in even drier areas than ours, summer fallow might be a good business practice, but they make it look like you're a horse's ass if you do it (Status Producer #1).

Adopters of zero tillage referred to benefits of zero tillage in the same way, namely: 1) it kept the soil from blowing; 2) it retained moisture in the soil; and, 3) it made economic sense.

In 1990, I was still using conventional tillage, but watching all the soil blow – that was the last time I ploughed. Now, with zero tillage, I can keep my job in town, and still farm (Conventional Producer #12).

Ten respondents (16%, n=64) challenged the idea that zero tillage is a better way to farm. Eight of these were alternative producers, and two were conventional producers. When asked about whether the government should be promoting conservation in agriculture, this alternative producer responded:

Not if they are talking about no till; it's a scam. Putting chemicals in the soil is not conservation (Alternative Producer #1).

Status

A certain amount of status was associated with having adopted zero tillage, and producers commonly communicated with pride that they had already adopted. However, because zero tillage was so widespread a practice in this sample, this was not the only form of status that was communicated.

Status producers communicated their status not from having adopted zero tillage, but through other means, such as the state of their yards and driveways, their equipment, and the level of success and professionalism they were able to exhibit. Some also communicated their status – as one of the community's most successful farmers – by making it known that they had adopted zero tillage 20 years ago (before it was a common practice)

4.1.6 Farm Structural Variables

There was a significant association between farm type and the person's opinion regarding the statement …

- "The government is responsible for ensuring the responsible use of our environment" (n=64, p=0.0377).

The three farm types were crop, livestock, and mixed. Almost no significant differences were found concerning farm type on selected dependent factors. The results indicted that **the only major difference was on the views of livestock producers concerning who should take environmental responsibility**. Over half (59%) of the livestock producers *disagreed* with the statement.

4.1.7 Ecological Variables

When asked if there were any agricultural practices that caused them concern, 69% of respondents answered yes (n=62). Fifty-six percent of respondents were concerned about the use of chemicals on the farm, whether it was fertilizers, insecticides, or herbicides. Almost 25% of people mentioned improper practices revolving around the livestock industry, particularly manure management causing run-off, and intensive livestock operations (n=46).

Producers were then asked if the above practices concerned them more in terms of the health of the land, water or their family. Responses to this question were broken down into family or biological concerns. Fourteen percent of respondents answered family only to this question, 40% answered either water or land, and 46% answered both biological and family concerns (n=42).

4.1.8 Institutional Variables

There was a series of themes that emerged referring to the institutional factors that contributed to producers' ability (or inability) to adopt conservation and food safety practices.

Information Creation and Diffusion Systems

Many producers (38%, n=64)) raised concerns about how conservation information is created and diffused. Conventional producer #11 expressed his opinion that some of what researchers claim doesn't seem to be well proven, and he thinks part of it has to do with how research is carried out:

> A lot of scientists come out to the area, and are they are very well spoken, and well read, and they present us with their talk and their brochures and stuff, but a lot of this stuff is not very well proven, in my opinion. Like with these sage grouse studies, for example. I think a lot of that stuff isn't proven, even though they say it is. And people listen to them 10 times more than they'd listen to me. These researchers come out in the summer, and chase the sage grouse around, and then they write a book, and they think they can answer why there aren't so many sage grouse in the country, and I don't think that's how it is. They say it has to do with grazing cattle, but I strongly believe that is absolutely not true. Two hundred years ago there was millions of bison in this country. Across the border right now there are tons of sage grouse still. In the 1920s and 1930s there was hardly any deer around here, but now there is tons. Those are just examples, but like I say; nobody listens to us (Conventional Producer #11).

The above producer questioned the amount of influence that these researchers have, as well as the system these use to create their knowledge. He summarizes the system in the following way:

> Some politician sees a problem and asks someone to come up with a solution; some researchers come out with all that government money, and do their thing, and have a few months to get their data and all that, and then come up with an answer. They spend all this money – sometimes a lot of money – and when their answer goes back to the government they look at the report and say, 'Well, we spent all this money; we have all this information; I guess this must be the solution that we should follow' (Conventional Producer #11).

This producer stressed that he believed in the need for research, but questioned the problem/solution mentality. Taking care to not place blame, he felt that the standard approach to some of these issues should be reconsidered.

There were no other producers who articulated such a thorough critique of how knowledge and research is created and conducted, but there were numerous statements that deal with this same issue

One Size Fits All

16% of producers (n=64) communicated that government extension sometimes has the tendency to provide simplistic answers that are meant to fit the diversity of producers and

producer situations across the province. These producers communicated their belief that many of the conservation and food safety practices being promoted by the province were not applicable or realistic for their geographic situation One status farmer from southern Alberta commented:

> There is some real wonky stuff in the Environmental Farm Plan. What irks me is they've only got 2 or 3 answers, and no answer really applies to our geographic district, so your answers are either totally wrong, or … and again, if you are trying to do one book for the whole province, you probably aim for the centre (Status Producer #1).

Another large producer comments on the fact that there is no formula for good management:

> I don't think adopting these practices will help the operation. It all depends on the weather. We are already doing all we can – our ranch is already under-stocked in some areas; we have carry over grass; things are good on the ranch – but if it doesn't rain for a couple years, what can we do? The practices won't really help. Every year is a little different; if there is less moisture, we manage the pastures a little differently; if there's more, we manage differently. Things aren't stable here – it's not like it is in the north where things are more stable – things change all the time. You can't have one practice that will work and help things; you have to be flexible and responsive. There is no formula for good management, like a lot of these practices imply (Conventional Producer #11).

This rancher was careful to clarify that he doesn't think conservation practices are bad, but simply that the way these practices are 'packaged' like remedies or solutions is something he does not believe in. It should be noted, as well, that this rancher expressed one of the highest levels of environmental concern, and rates of conservation adoption, of any of the respondents in this sample.

Later on, he suggests:

> They have to work more with real examples, not just on paper; real examples specifically designed for our area. If a guy comes from out west, near Waterton; practices designed out there won't necessarily work here. It is very isolated here. There are certain grasses that don't even grow here that grow 100km to the west or south – but they don't grow here (Conventional Producer #11).

Complexity and Impracticality

Some producers in the sample communicated their frustration at the government's tendency to create programs that are too complicated to be of any practical use. One example that was referenced was the Canadian Agricultural Income Stabilization Program, which requires an auditor and other experts to help understand and complete. It was stated that by the time all

the work has gone into getting paper work ready for the government, whatever good that could have come from the given program is already lost.

Some programs were criticized simply for their impracticality. A producer from southern Alberta gave his opinion on the Alberta Environmental Farm Plan, which he was currently doing:

> There are a lot of things in there [the Environmental Farm Plan] that are impractical if you actually run a large operation. Like with storing chemicals; they suggest you don't store chemicals but you just use for your immediate use. Can you imagine the logistics, how many trips to town, and how much fuel you would burn going to town every morning!? And the line-up that would be at the chemical shed?! Whoever thought that up doesn't live in the real world. They couldn't have had a farmer with a brain on that planning committee. There are a lot of things with the Alberta Environmental Farm Plan that just don't make sense. They don't differentiate between liquid fertilizer and granular, for their offset distances...there's a whole bunch of things. You're going to end up in the toxic column, and there is no reason for you to be, because in the real world you couldn't operate on any practical level the way they want you to (Status Producer #1).

It should be noted that many other producers cited the Environmental Farm Plan as an example of a practical and simple program. The important point to note here is that producers did call for more practicality in extension programs overall.

A rancher from southern Alberta also commented on the impracticality of some proposed conservation practices, specifically regarding solar pumps for dug-outs:

> I can give you an example: solar pumps on dug-outs; that's a conservation practice. I tried it, we bought a pump, we used it; it's not practical. Too many things went wrong with it. It might be okay if the pump is beside your house and you only have 50 cows, but if it is way out – I told you, we have 40000 acres in about 5 different townships – it's just not practical to use. It's not reliable, and I have to be able to fix it, too; that's another thing. It isn't practical to drive things all the way to town from out here and expect someone else to fix things for you (Conventional Producer #11).

Large Corporations and Increased Production

There were many references throughout the interview process in regards to the size of operations, the (perceived) need to increase production and the optimal levels of these. A small number of producers felt that the government favours large operations over small operations, as can be seen (according to these producers) in programs that are structured for, and assume, issues relevant only to large producers, seemingly without consideration for small producers. Two small livestock producers raised this concern in terms of food safety practices they needed to adhere to despite their contention that these are made solely for large

producers. These two small hog producers contended that their food was safe, and they believed in food safety, but that they needed to find ways to take standards that were seemingly made without consideration for them, and make these work for their situation.

A sense of frustration was also expressed by some producers towards the large companies that profit off of the work of producers, while producers struggle to make profits.

One 4th generation farmer from southern Alberta explains:

> It takes a lot of money to run an operation our size – probably between $800 - 900,000/year – but we're just not getting the money we deserve for our product. You've got the big chemical companies coming in, the fertilizer companies coming in, and equipment companies. And they're not just making a little bit of money; they are making gobs of money. It's atrocious. When you go trade a piece of equipment off – we just traded a piece that was 2 years old, and we paid half a million for it. After 2 years, only 700 hours, it's only worth $180,000 (Status Producer # 20).

Believing in something that might not be completely true

One conventional producer directly called into question the beliefs that decision makers, scientists and extensionists can bring to their work:

> Sometimes I think we've been misinformed by some of these people. They come here, and they believe in something, they are doing their studies; they are being paid to do their studies. They are smart people, nice people, and they are just doing their jobs, but when you live out here everyday, year round for decades, you look at things a little differently (Conventional Producer #11).

Other producers indirectly raised this same issue, most often by admitting that there are simply some areas where adequate knowledge is lacking. This was most often referenced in terms of the unknown or contradictory effects of zero tillage.

A different conventional producer from southern Alberta, a practitioner of zero tillage, repeatedly communicated his nuanced feelings regarding his decision to adopt zero tillage, despite the fact that the researcher didn't once question him about it:

> When you live out here for a long time, and you see all those dust storms, and the soil blowing, it makes you…like these organic farmers who go over the summer fallow all the time, is that better than chem. fallow? Well, it's hard to say, because you're talking apples and oranges; you're not talking the same outfit. Chem. fallow, that keeps the land from blowing, and the other way builds up your land, but it takes long. It's hard to say….I don't think there's anything else I can do. Organic farming, I don't think it's…well, I don't know what to think, really, so I can't really say that. I think that chem. fallow is the only way to improve it so that it's not blowing…but it's not that

> environmentally friendly either, sometimes (he laughs) (Conventional Producer #17).

4.2 FOCUS GROUPS

Two focus groups were conducted, both in northern Alberta. A total of eight participants contributed to each focus group. Focus group #1 was conducted in St. Paul, Alberta and focused on issues of conservation and general agricultural issues, while focus group #2, held in Fairview, Alberta, dealt almost exclusively with questions of food safety and farm direct marketing.

4.2.1 St. Paul Focus Group

Table 3. Key Themes from St. Paul Focus Group.

Themes Raised by Focus Group Participants
1. Extension information 2. Structure of agriculture 3. Sustainable farming practices 4. Policy 5. Future of agriculture

<u>Extension Information</u>

Participants mentioned a variety of sources for finding information, and different levels of satisfaction with the information coming out of government extension. All participants agreed that the old system of extension, with the district agriculturalists, was a very good system:

> The [district agriculturalists] were a part of our farms; they knew us, they knew our operations, and they knew which way to help us (Participant #2).

Another participant agreed:

> It was terrible to lose that (Participant #8).

At a different point during the focus group, a different participant commented on the old way of extension, focused around the district agriculturalists, and added this:

> I think we have learned of ways to do without them. I think when we had them they were great, they were a great resource, but we had no choice so we

> kind of got weaned off – for lack of a better term – and we had to go and develop our own resources, and be innovative (Participant #6).

Two participants (of 8) were frustrated by the lack of alternative farming and ranching information that could be found and accessed in Alberta:

> Through my children going to school I was introduced to a type of farming called bio-dynamic farming, which is a type of organic farming that is so well known in Europe and we know nothing about it here. You can't even get a reference book about it; you have to write away….There is so much knowledge there that has already been done by bio-dynamic farming in Europe for a hundred years and you can't even get a workshop going here; you have to go to British Columbia. In Germany and Switzerland and France, Britain, all these bio-dynamic farms that we're crying for now, because look at what is happening with our farms. But there is no information here (Participant #7).

The focus group participants seemed to agree on how they find their information:

> Participant #6: Publications – the Western Producer is the staple reading diet, and networking I guess with other producers. I read cattle magazines; you get ideas out of there. A lot of stuff is by trial and error. You learn from the school of hard knocks. Farmers are good for that.
>
> Participant #2: I'm pretty well the same. We go to meetings; we meet at meetings and share ideas. Magazines like Cattleman, Grain News, whatever. When I deliver bulls I talk to the farmers, share ideas again; what works for them, what works for us. Basically sharing, sharing from other farmers, at meetings, magazines, and through trial and error.
>
> Participant #4: I think they pretty well covered it. I think that is basically it. My husband belongs to several organizations where he would talk to other producers and get information.

Structure of Agriculture

Participants at the St. Paul focus group raised a number of issues that pertain to the structure of the agricultural sector, including the tendency for increased production and size and the influence of large corporations.

Production and Size

A respondent from one of the focus groups summed up the sentiments of many producers from this sample:

> The challenge I've faced in my 30 years of farming is that we've been caught up in the race to the bottom. We've been told we have to … be more efficient and produce for less. And every innovation that has been passed in front of me, I've been told to grab on to it. If it's set out to produce 15% more, I can be pretty well sure that the value of that commodity would go down 17 to 18%. So the net benefit to me was zero and in some cases a negative value. That has been the frustrating part of being involved in agriculture. What we've done is taken on more work to try and make up the short fall. So we are to the point now where we're thinking we've worked ourselves raw. We're doing all we can, plus some. How are we going to try and back the train up, maintain our profitability and try to get out of this gerbil wheel we're on before it kills us? That is a pretty blunt assessment but that is how we've gone with agriculture in the last 25 or 30 years (Participant #6).

This participant was frustrated by the mixed messages he felt he was hearing, and at the feeling that it was impossible to be bigger, faster, and cheaper while at the same time improving conservation practices.

There was also a common sentiment that if agriculture continues to proceed as it is currently, the only operations that will remain will be large, corporate operations, with family farms becoming unfeasible. Some producers communicated that they expect the government might even prefer an agriculture system consisting of only large operations, although all of these producers clearly stated their concern with the idea of an agricultural sector without family farms.

> We visited Brazil a few years back and my husband and I were amazed at how massive these fields were. It was all one big field in Brazil, and we were standing there and saying, this is what Canada is going to look like in a few years. It is all big industry there and monopolies. The whole industry; the grain industry, the animal industry, chickens, hogs; all of it is handled by big, big companies (Participant #7).

Large Corporations

During the St. Paul focus group participants engaged in an in-depth discussion about the influence of large corporations on their livelihoods:

> I think one of our challenges is the fact that agriculture wants to operate a free market system right? But the free market system doesn't work very well when you're at the mercy of monopolies that control your work and your product. We've got Cargill and Tyson Foods and Excel: those are our three players. People like to believe there is competition, but there is no competition. I knew somebody who worked in the auction mart, in the finished cattle auction market, and he said those guys are meeting every Monday morning, having a conference call to decide where they're going to price the cattle for that week so there's no competition. We don't have any competition: "Where are we

> going to put the steers? Okay that is where they put the steers." (Participant #6)

Sustainable Farming Practices

The St. Paul focus group spent a great deal of time discussing sustainable farming practices, and debating with one another which practices are truly sustainable. A lot of this discussion emanated from the organic producer who was present and the challenges he posed in regards to the sustainability of conventional farming and ranching practices. The organic producer was not the only producer expressing interests in alternative farming practices, however, and all of the participants communicated a high level of environmental concern and interest.

At one point, the organic farmer raised concerns about the use of chemicals in current agricultural systems, and a series of topics were discussed that all stemmed back to sustainable farming practices:

> But what happens if you can't spray? I don't care, you can use zero till anywhere you want, but if you don't spray you got no crop. By zero tilling, you're conserving moisture, but you're going and spraying double. So is that a benefit? I think if we were to farm maybe a little bit smarter, we wouldn't have to spray….People around here never sprayed 50 years ago and somehow there used to be big crops and nice stuff. All of a sudden now, if a guy doesn't put on 250 pounds of nitrogen, he can't grow a crop. We conserved the land better in the past (Participant #8).

He then raised the issue of continuous cropping and how the structure of agriculture seems to encourage this sort of practice:

> You see, before they used to give and take. Take a crop and let it rest; pasture the cows or whatever. Nowadays it is just seed and seed and seed and seed. I'm sure there is some land around here that it has been farming 20 years and has never seen a break (Participant #8).

To which, another producer responded:

> You have no choice, you've got to pay your bills (Participant #7).

In response to this discussion, a different participant raised concerns over the cheap food trend that seems to come from consumers and how this is affecting sustainability:

> You've got to produce the food cheaper and by producing the food cheaper you encourage over-production, which in turn drives the price down. Then you've got to turn around and produce it a little more cheaper in two or three years time. It is just part of the recent trend. Years ago wheat was $3.50 or $4 a bushel, and you could do that because you had no inputs, or very few inputs – a lot of farmers in the St. Paul area 40 years did sweet clover plough down.

> They didn't summer fallow. The last year they would put a sweet clover crop in they would let it grow that high. They would go out with plough, and plough it down – green manure. No soil degradation – the sweet clover rebuilt the soil. That is why the soil in St. Paul area is as good as it is, because of the farming practices. It's not due to this new requirement of having to produce everything cheaper. Fertilizer use increased so to do that we got to put that crop in every year because we've got more land payments we figure we should be more efficiently (Participant #6).

Another producer raised the issue of Environmental Goods and Services, and the need to pay farmers and ranchers for the environmental benefits they contribute, and help them in terms of labour to do more:

> Two big things: give us money, give us help. We'll save your world but we are short of time and we are very short of money. But if you give us somebody to plant lots of trees and send somebody to work those trees and water them during the drought, you will see the difference all over (Participant #2).

Policy

All focus group participants had something to say in regards to government policies and how these can affect their practices.

Four (of 8) producers commented on their frustration at government policy that encourages producers to cut down trees on their land:

> Participant #5: There are a lot of trees on my land, and a lot of dying trees. We would maybe clean it up or something, but for what? Because all they do is tax you more on anything that you've improved.
>
> Participant #1: All my neighbours around me are paying less than a quarter of what I pay in taxes. I'm paying four times as much as anybody else is paying because I have trees. I'm not a farm, and I'm not an acreage. I'm a quarter but I'm recreational. I am one single quarter but it can't be used, it is useless land except for the beauty of it. So I'm working my second job just to pay my property taxes.

And a different producer:

> The county is responsible for so much damage to in terms of conservation and the environment. Guys that are building highways. There should be a program where we are going to take down a mile of trees but we must get a program where we pay the farmer to work and plant trees a 100 feet away to replace them (Participant #2).

Another participant agreed that the county made decisions that seemed to contradict the idea of conservation management:

> She is right because in my area right now there are big subdivisions that want to go in there, and it is right on the river. They own the river. They [the government] are pretty particular on how close I can pasture my cattle to the river, but they are going to let these guys build houses right there. Why? What is the big fuss? It is all about money, and these guys that are buying this land don't live here – they live in Calgary and Brooks and are buying this land on speculation (Participant #8).

Another producer felt that it wasn't just the government, but also a mindset with producers that would have to be addressed:

> When we moved here 30 years ago, you couldn't see the lights of St. Paul (we are 15 miles out of St. Paul). There were all these quarter sections that people had farmed but they had trees on them. They left it on the tree line, they left it on the low spots, they left it around the sloughs….But we have an attitude of slash and burn. Right now just west of me we're slashing and burning some more. So how is it that our farmers even today don't know enough to leave the damn spruce trees in the low spots for those things? They are still doing that (Participant #7).

Two producers felt that there were now too many food safety rules, and that in recent times these regulations have become unreasonable:

> I feel like we should get the government out of here. You know, now you can't have your potluck – don't bring that special thing that your family's been making for the last 50 years and taking it to potluck. Well don't bring it because it's not safe. Europe I think has probably some of the best regulations, but they are not crazy over their food things. I know this because my son is talking to the market there. I think we've just gone overboard because we had BSE. I think it drove us nuts. I think we went crazy (Participant #7).

Future of Agriculture

The participants raised many questions and concerns in regards to the future of agriculture. One recurring theme (raised by all 8 participants) was the sense that there is not enough young people staying on the farm, and the question was often asked, "Who will farm after we are gone?"

> There will be a big shift in a few years from now because there are all these farmers, they are 70-75 years old and they have to sell; but who is buying it? Does it go into recreation, or does it go broke? Who picks it up, or will it all be lost? (Participant #3)

Another producer agreed:

> My fear is: who is going to do this when we're done? My kids won't be doing it….When this generation is done, my fear is we're done. That is our challenge: to figure out a way to make it sustainable so that we have people to do this in the future; so that we can remain self sufficient and stewards of the land (Participant #6).

One participant commented on the important role that producers play in supporting communities, and how if we lose family farms rural communities will suffer:

> These small towns, I think even in the drought and even through BSE, a lot of the small towns were still supported by the farmers. But when the oil boom is gone, it is gone. Bonnyville is a perfect example. They had the biggest city that was booming, booming, booming, but all of a sudden when the oil went it was a ghost town. For a lot of towns around this area, if it wasn't for the farmers they would be gone. But the farmers are getting less and less and no kids are taking over the farms (Participant #8).

This issue was directly tied into the crisis that producers feel agriculture is in. They communicated the belief that in order to attract youth, agriculture would have to become sustainable, which would require good practices, more education, and fair prices:

> I think it is the same sort of thing; I think we need to get more information out to farmers and to non-farmers about the situation that we are in. I think there needs to be support for the farmers to continue using good farming practices so that farms will continue to be viable. Our son isn't going to farm either and neither is our daughter, so we are looking to sell our farm. But who is going to buy it? And why would they buy it when, like you say, it is in a downhill trend. We need to have a fair return for what we're producing. We're trying to produce safe food. It is food that we would eat, but it costs a lot of money to produce that food, and we are definitely on a downhill turn here, and we need a fair price (Participant #4).

One of the participants summed up the situation:

> We're a group of people; we're a very unique type of people. We go to work every day and we really love our job. We love it so much that we do it even if we don't get paid. I don't know of anybody else that does that. I also know that you can have the biggest house on earth, the prettiest car, and it doesn't matter if you can't eat. You will not need it. It needs to be recognized that we are important. Maybe start giving us what we are worth as far as what we produce and what we do for the environment; start paying us for the environment when we leave trees to clean the air and when we manage the land. I don't care how you do it. We love the land there is no question about it.

> Everyone here loves to save the environment; we wouldn't be here otherwise; we would do like everybody else. Every one of us here wants to have the best food, the safest food, the best land, the prettiest land, the most trees, the prettiest trees and we want bugs on our land; we want wildlife to come up and drink at our water holes; we want that. I think that we are borrowing this land right now from our future generation and we are in trouble. We are in deep, deep, trouble right now because we are fighting to hang on to this, but we are the only ones that give a darn; everyone else seems to think that we're going to keep doing this for nothing, and be able to do it forever, for nothing. Nobody goes to work without a pay. We have been told so many times, 'By the way, you guys didn't know about this, but next month I'm going to cut your wage in half.' We have been cut in half and in half and in half to the point where we need to ask…do you need us, or don't you? (Participant #2)

4.2.2 Fairview Focus Group

The Fairview focus group, unlike the St. Paul group, was premised around questions of food safety and farm direct marketing.

Table 4. Key Themes from Fairview Focus Group.

Themes Raised by Focus Group Participants
1. Finding information 2. Dealing with requirements 3. Tradition and practice change 4. Contact with consumers 5. Barriers to adoption

<u>Finding Information</u>

When asked where they go to find information regarding food safety and farm direct marketing, respondents had both positive and negative responses.

Almost all participants (7 of 8) indicated knowing specific extensionists who they contact when looking for information, and these known extensionists were spoken of in a positive way. Specifically, participants indicated that there is a team of knowledgeable Alberta Agriculture extensionists in the Peace Region, well known to these participants, and who were indicated as being valuable sources of information.

Finding People

In terms of finding the right person to answer specific questions, one participant stated simply:

> I usually call Karen or Susan or Penny – depends on what I need (Participant #4).

Another participant answered in a similar manner, but explained how this falls apart when one's contact doesn't know the answer to a particular question:

> I contact our local health inspectors. I have a very good relationship with them, and if I have questions those are the first people I'm going to call. They know the provincial thing, but if I start asking any kind of questions about packaging beef and stuff like that – if it is a federal thing – they don't know and they don't know who to contact (Participant #6).

In response to this, a different respondent commented:

> I believe that the contacts are there, but they just aren't using them – for whatever reason, they are just not using them. If you call them with a question, they should know – that is their job – they should be able to answer your question. If they do not know the answer, they should at least put you in touch with someone who does (Participant #5).

A different participant commented at a different point during the focus group how being passed on can degenerate into a cycle:

> What happens is you get the round robin thing; you get one person but it's not their department so they pass you on to someone else, and it just goes on. You can spend days just trying to track people down, and then they just pass you along to another (Participant #7).

And another participant:

> Where do I go for information? I went to a lot of places and I found information very, very hard to get when I started. I had to dig like crazy, and I asked a lot of people a lot of questions. I talked to whomever I had to talk to. Plagued Karen to death and whomever else I could find. I went on the Internet. I'm an avid reader so I read lots and lots of books about manufacturing, how to find proper equipment for small scale stuff; that was very hard to do, and I still wasn't totally happy with it (Participant #8).

During another exchange, later in the focus group, three participants discussed how difficult it can be to find the information one is searching for:

> Participant #4: I find there is way too much garbage – as I call it – on the web site.
>
> Participant #6: You've got a question but you can't get an answer.

Participant #7: No, not a real answer. I mean, you're going around and around and you're reading all this other stuff that doesn't apply to what you're looking for.

Participant #5: I've learned this little trick: most web sites have a 'Contact Us' page; I go straight there and ask them a question and they e-mail me back an answer.

Participant #7: Sometimes.

Participant #4: We don't have three hours to sit behind a computer; I've got 40 minutes, but…

Internet

The internet was discussed with a certain level of frustration. The following is a conversation between participants:

Participant #7: With the Internet I couldn't even find out how to get all the information I wanted; there are too many sites showing me everything.

Participant #4: It doesn't tell you anything. It tells you that you can get this from this location and these are your products.

Participant #6: I get that when you call the government and they say oh it's on our web site. I'm sorry, but I would like to talk to a human being, please; and, they say 'No go to our web site and download it." We are on the worst line for the Internet; it is so slow it is not funny. Wireless is coming, but there is not a properly maintained server….when we try to download something off the Internet it is so slow that it crashes.

Participant #2: I don't have Internet.

Participant #6: You would love to be able to do it, you want to be able to do it, but we are on the narrow end of the line and you've only got this much bandwidth.

Participant #5: You are not even better off if you do. Then you get six pages of information, and you still need to write out the answer you've been looking for.

Participant #4: You are probably going to get into this, but by the end of the year we have to have nutritional facts on our jars, and I've gone on the Internet looking for information. There are so many sites, and it says you can download this for free and you can get your nutrition information and it will

> flesh it all out for you. Try and get that. It is impossible to use. I get this page that says 'This page is no longer in use'.

The Nature of the Information Systems

The participants commented frequently on issues pertaining to how information systems are set up and run. One participant commented on the internal politics and personalities that can affect the type of information one receives:

> There are attitudes out there. Sometimes they say, 'Oh no, you're not allowed to do that,' but I am very stubborn and ask 'Why not?' They should help you figure out how you should proceed, but instead they are putting all these stumbling blocks in your way. So then I go over their head….We had an incident the other day and I ended up going right to [the boss]….and I was allowed to do what I wanted to do to begin with, but I had to go in a great big circle: 'You can't do it,' 'There is no way you can do it', and then, 'Oh yeah, you can do it.' If you take your issue to each individual inspector you will get a different answer from each one (Participant #5).

In response to this comment, another participant who had been dealing with a similar issue responded:

> You are getting different answers than what I'm getting. Like you said, each health inspector seems to have a different idea of what it right….Maybe there should be more contact or continuity between the federal and provincial; maybe those guys needs to work hard on having a better system or something (Participant #7).

At a different point in the focus group, another participant suggested:

> There is a need for an improved database. If you are looking at food manufacturers and safety, I would like to see a one-stop shop where you go and you can see that these are your resources; these are your suppliers; this is where you get the answers to this type of question, etc. That would save us hundreds of dollars and a great deal of time; that would be very good (Participant #8).

This same participant later shared an example of how the system can work very well:

> When I went to get federally inspected, I was going to get provincially inspected first because in those days I thought you had to do that; step one was provincial, and the federal was step two. But in town the inspectors were having coffee together and so later one of the feds phoned me and said he'd do my inspection because he knew I wanted to sell across the country. I thought, 'Wow!' They were going to come the next day, so I stayed up all night typing and getting all this stuff on the computer that I thought I needed, because I downloaded their standards, which were quite similar but there were

> some differences. So I said to him, 'Can we consider me a work in process?' and he said, 'I've never done this type of facility, so let's learn together.' You know, I wouldn't have been able to achieve what I achieved without an attitude like that. If everybody had an attitude like that it would be wonderful. Consider it a work in progress; work with clients that come to you, and learn together. Because you have to meet the standards, but in order for a very small operation to meet the standards of Alymer or Food Corp or whatever, where you have quality assurance people walking around…that isn't going to happen because maybe you're a one man show. But satisfy them that you are meeting what is asked for; that you may be meeting it in a much smaller fashion than that; and, it may mean working on it too (Participant #8).

Dealing with Requirements

All participants discussed the challenges in meeting government, industry and consumer food safety requirements. Most participants gave the impression that they agreed there should be food safety requirements, but some felt that these were sometimes prohibitive for smaller producers (like all of these participants were).

> It is important to see regulations put into place and maybe the government should dish out some money to help pay for the transition. Put out a grant that allows you to buy this program for your farmers market [so you can put nutritional information on your labels] (Participant #7).

Another participant mentioned how meeting consumer demands can also be challenging:

> We test our honey every year for pesticides. We have certain customers who request it. It is very expensive. I think last year on honey residue testing it cost us over $3,000 (Participant #1).

Another participant commented on how meeting requirements often takes creativity, in order to make your operation fit standards made for other operations (often bigger):

> But what was hard for me was to find the processes to fit that goal. Like it says you need a certain type of sink because of sanitation and stuff like that; if you need a blow system and stuff like that, whatever. So I would ask questions with this in mind and then I would develop and fit it into what I had (Participant #8).

The following participant expressed a common sentiment of feeling limited by some food safety requirements:

> We have to ship our turkeys and chickens all the way to St. Paul, which is a seven hour drive; I can not have them processed in northern Alberta because it is required as law. We need to have a small mobile slaughter facility in the Peace. There is a whole gamut of things that have to be jumped over to do

> that. There is no way a little guy can do it. It is almost like it is set up for the big boys and nobody else. I think the goal is food safety. There should be different models for different scales of industry. Yes, there needs to be a certain level of management at the high level or when they are doing 1000 cattle a day. I can see where they're coming from. But what about 10 animals a day? Maybe once a month? There should be some understanding of different scales of the industry instead of just 'enormous'. If you are trying to run a small operation, like we're trying to do, you have to try and scale down their rules, which gets kind of overwhelming at times, and very expensive (Participant #6).

This monologue inspired two other comments that fit into this topic:

> A lot of this is the interpretation of the standard and the education of the people that are trying to use it. A couple of things, I'm just picking up on what you said, the types of flooring. The standard is for something without bumps and rocks that will catch bacteria and blood and how do you achieve that? That is the point. The other thing is I think there needs to be that extra help to help individuals with the interpretation of everything that comes out of the food regulations. I'm an owner and some of the things I see – like not using the glove technique properly, because you have to go wash your hands and put on the gloves except the gloves don't go on in the morning and stay clean and sterile all day; every time you touch something you pick up something (Participant # 8).

This participant's point was that one way to help small producers meet standards made for larger producers is to get at the motivation behind the regulation – e.g., why do floors need to be seamless? - to prevent bacteria and blood from catching on the floor. Her argument is that instead of being a caught up on the literal regulation of having a seamless floor, inspectors and small producers should be finding ways to stay true to the motivation even if the execution isn't precisely the same. Her glove example was meant to further illustrate this, since the motivation behind wearing gloves is to stop the transmission of bacteria, but she contended that sometimes just washing one's hands can work better. One could be following the literal regulation – wearing gloves while working – but still miss the point, which is to stop the spread of bacteria. She was arguing that washing one's hands, although not the standard, could still work better at meeting the desired end.

These two comments led a producer in another commodity group to comment:

> The beekeeping industry is pretty straightforward; you just download a bunch of pages and then you follow the rules. It is strictly on beekeeping that I'm talking here. It should be, however, that beekeeping establishments are subjected to inspectors. They should all be. That is my only complaint: enforcement. These regulations should be enforced. If you are not inspected for honey, you shouldn't be able to sell it (Participant #3).

The other beekeeper in the focus group agreed that those who aren't inspected could potentially hurt the industry if they end up making someone sick with unsafe food:

> For example, China got caught with a banned antibiotic in their honey. It would only take one idiot in Canada to use antibiotics improperly and end up with it in their honey and sell it to somebody else and have them package it and then sell it to somebody who tests it and then all of sudden Canadian honey is not allowed to go anywhere (Participant #1).

Participant #3 had also called for more requirements earlier during the focus group, to help the honey industry and its marketability:

> There should be more Canadian Food Inspection Agency requirements, and specifically for me in terms of traceability. It means more paperwork but I think when you get around to it, it is easy and it will be very useful. I won't go any further than that but traceability is very useful. We have been doing it for two years already. We use it for two things. One, for when you're marketing honey; the reason is to show the difference between canola and clover honey. We do focus on clover honey but if you have a canola field blooming beside you, you're going to get both. So then you can record the honey, where it comes from and what date. You can record when the canola blooms and stops blooming so then you can figure it out. It sounds more complicated than what it is. You keep an old book in each truck and when you get home it takes about 15 minutes a day, which sometimes we don't have, but at the end of the year it gives you something to do in the winter when you might . . . it helps you with marketing and selling and producing….I'm a regulation guy. They want to know how many flowers you cut, so… (Participant #3).

Tradition and Practice Change

Participants communicated a progression in their practices once they had been educated about food safety. These changes were often quite different then what they had always known was right and safe.

> The more you learn about something, you say I didn't know that and I need to incorporate that into what I am doing in making food….You hear what creates spoilage, and then you really start to think about the environment that you're creating in your jar….You begin to think, 'Well grandma made it that way, and if it did spoil you just took the green off the top when the wax fell in.' That was not too long ago, I can remember that. Jelly never had a cap on, it just had a piece of wax. Green stuff was good (Participant #8).

Another participant:

> We changed our market completely. Now we do direct marketing instead of commodity marketing. The focus on food safety came with going to the

> [farmers'] market venue, although we were already hyper on food safety because of family issues (Participant #6).

A different participant commented on how concepts once foreign to her are now integral to how she operates:

> Cross contamination has become a chosen word for me. I'm not sure that I understood that before, with how I used to do [food safety]. Education needs to be for everyone and free.

One participant commented on the need to be adaptable, and to avoid falling into the mentality that tradition is always right:

> I think you can't go at it close minded; if something comes up and they say this is the rule and you need to change it, you can't go 'I'm not going to change that; I've been doing it this way for twenty years and I'm not going to change.' You can't do that; you have to be able to evolve if the need arises, because you have a lot of ability and can cope (Participant #1).

Contact with Consumers

All participants discussed at some point the direct interaction they have with their consumers. One participant discussed the satisfaction one gets from selling to people and having feedback from them:

> To me, I get great pleasure when somebody comes and buys your honey and they like it. To me it is really sad when a truck comes and takes all the barrels away and then you've got nothing left to show for it. A person comes to buy your honey and he takes it and you see him in town and he says, 'Oh I liked it,' and you say, 'Oh, do you want some more?' I haven't had anybody say they didn't like it, but I always ask; I think that is good (Participant #3).

This contact made the need for food safety a more immediate concern for these participants since they see and are aware of their consumers:

> I want to be able to sleep nights and not think that my product went out and caused harm (Participant #8).

Later on in the focus group, this same participant added:

> I've had customers drive from Dawson Creek to see where their food is made; they wanted to know. They wanted to see where it was made to satisfy themselves, and after that they became very good customers, but there were periods… (Participant #8)

Consumers were often cited for inspiring further food safety precautions and actions:

> I had a question [from a customer]. I had a man who asked about the fruits I put in my products; he wanted to know when the bushes were sprayed and what type of spray was used on them….That is actually a very good question; it shows that they were thinking, and that is something that I need to find out (Participant #8).

Another participant, in the same vein:

> You want to know that somebody is not going come back and say, 'I've found this in your package; what happened?' You should be able to say, 'I verified my product, and here is the documentation.' A happy customer will tell one person and an unhappy customer will tell ten; you have to be aware of that. If you are out there and making something that is not up to standard and somebody is telling everybody else about how poor it is, then pretty soon you're not going to have any customers (Participant #1).

Barriers to Adoption

Participants were asked to discuss those things that keep them from adopting more food safety beneficial management practices. All participants agreed that financial issues, and a lack of adequate financial incentives was a barrier. One participant said:

> I think there needs to be more financial help for small businesses. For example, if you need a federal kitchen, or you need a commercial kitchen, or you need a certain type of shop, and you need certain types of instruments; give us some help; don't just say, 'Here are the rules; now go build it' (Participant #4).

Another producer commented that there are plenty of rules but not a lot of information in how to implement them:

> Some change comes out with totally no information on how to achieve it; no education. Where do you go for that information? After the date comes out, the date is here and you have to achieve it by then, and you are phoning all over to find out 'How did they do that? Where did they get that result from?'….There is no manual on 'how to.' They just say, "Here are the standards' (Participant #8).

One participant discussed how the impracticality of some requirements act as barriers, because they just don't fit her situation:

> I want to have a fruit stand; you know, a wooden shack with a roof. So I phoned my health inspector and asked what I need. He says I need a sink, and I go, 'Okay, but it's in the middle of field.' Then he says that if I am going to

> have people there, I am going to need a washroom, too….At the scale we are working on, it just doesn't make sense (Participant #6).

This inspired a discussion about how the regulatory agencies can act as a barrier to those trying to create sustainable small businesses:

> Participant #8: That is something that I've struggled with all along too. When we started to develop something up here in the north it hadn't been done before, and they didn't know where to put us. Where they put us might not have been even relevant.
>
> Participant #1: The other thought too is how does someone go about inspecting you when they don't know what they are inspecting? How do they know you're following the rules if they can't even tell you the rules to begin with? And yet they have the final say where it is a go or not.
>
> Participant #8: So we're doing this now and we're not going to go away. That would be part of the issue. How do you find the appropriate standards to evaluate that business in that standard? That is a big issue.
>
> Participant #6: In business development we try to look at a lot of biographies of people that have been successful. One thing that I've noticed when you go to meetings with economic development is that they want to build the Hoover Dam overnight. They want the big guys with the billion dollars; they want to focus on 'big'. If you go back and look at your Rockefellers', at Heinz, at Hershey…they all started small. They didn't just appear. Heinz started selling his vegetables out of the back of a wagon. Hershey started selling his chocolate in a little tiny store; they would make them in the store. So if you guys want us to become Heinz and Hershey…
>
> Participant #7: They don't want us to do that; that is the problem.
>
> Participant #6: I think in their minds they think they do. It would be nice to be able to at least have the option to grow. I'm starting at the same spot as other people have who been successful have started. It appears to be an expectation that we're millionaires or something, and that we can all spend $60,000 for a federally inspected plant; but where does this money come from? We have to earn it; we have to sell products, and in order to have products we have to a facility.
>
> Participant #8: It is a market thing; what you need to do to be sustainable when you start out small. We don't always manage that. We need to meet the food safety standards; don't ever get behind on that.
>
> Participant #6: We don't want to; we just want to be realistic.

Another participant later commented on how one's motivation and fear can work as a barriers to adoption:

> It is a lack of motivation, and a lot of times it is fear. If you could find a way to dispel the fear…the fear that it is going to cost me money; the fear that I will be penalized; the fear that I will be taken to court; the fear that I will be shut down; if you can get past that and build a relationship with flexibility…. It is the fear, and the lack of money (Participant #5).

4.3 KEY INFORMANTS

Ten extensionists were contacted for the key informant interviews. These key informants represented a diversity of experience and background in the agricultural sector. Eight of the extensionists interviewed had a significant amount of professional experience, while only two were new to their roles.

Many themes emerged during these key informant interviews: those that focused on the practice of extension (Tables 6), those that focused on the larger issues facing extension (Table 7), and those dealing with agriculture in general terms (Table 8).

4.3.1 Themes Related to the Practice of Extension

Table 5. The Practice of Extension.

Themes Regarding the Practice of Extension
1. Need to have highly skilled and trained extensionists 2. Need a variety of tools 3. Consider type and amount of information 4. Personal aspects

Skills and Training

Four extensionists raised the issue of the skills and knowledge that extensionists need to bring to their jobs.

Three extensionists contended that the level of training for current extensionists, and their level of knowledge and understanding regarding agriculture and its sustainability was not as good as it could be:

> We need highly qualified people to deliver these principles. We tend to simplify principles and problems in order to make programs, instead of properly training extensionists of the complexity of ecological functions.

The same extensionist later said:

> A qualified extensionist, who understands agricultural and ecological impacts is critical, so he can extend these principles to the farmer in language he will understand, and that will bring the message home.

The fourth extensionist raised the issue simply to comment on the challenges facing extensionists:

> You need to have a broad knowledge base to be able to answer all the questions people ask of you. There is a lot of background to get up on, in terms of the different commodities, and the different issues that each commodity faces, like for cow/calf or for intensive livestock – you have to know a little bit of everything.

Variety of Tools

All ten extensionists cited the need to utilize a variety of tools in order to achieve effective extension, due to the diversity in learning types of producers, and the need for repetition in extension to increase the credibility of a message.

Extensionists warned against over-dependence on any one tool over another. Four extensionists made specific reference to the Internet, stressing that it should not be expected to carry the burden of extension, and one extensionist made the same claim for the provincial call centre. These six extensionists cited advantages to both of these tools, but felt that an over-dependence on them would not meet with success.

> The call centre is a good tool, but it shouldn't be the only tool in the toolbox. It is way too limited with too many expectations on it that just won't be met.

And a different extension, in regards to the internet:

> The internet is fast and easy, but so many people just don't use it. We have to be using more than just e-technologies if we want to be effective.

One extensionist commented on the need to vary one's tools based on where in the process one is in terms of diffusion and adoption:

> It works from the assumption that there are steps in knowledge creation. Depending where you are in the process the tools will differ. You can have mass media at the front end, but at some point you will need that personal communication with producers.

One-on-one

All extensionists agreed that one-on-one was the most effective tool of all, but all extensionists were aware that the financial and people resources would not be forth-coming in order to do the amount of one-on-one that was necessary. One extensionist explained:

> Working with producers one-on-one is the best thing we can do. Small workshops and smaller groups, in person, is the next best. The further away from personal communication with producers, the less adoption we have.

This same extensionist went on to state that there is still an important role for newsletters, Internet, and other forms of extension, but reaffirmed the conviction that one-on-one is the most effective. Another extensionist agreed:

> You need to have a face people can go back to. Once people know you, they will access you for information. You will become like a one-stop shop for them, and they'll believe you can find the answers for them.

Repetition

All extensionists commented on the need for repetition in extension, in order to meet the different learning styles and preferences of producers, as well as to increase the credibility of the message being delivered. One extensionist argued that if producers hear the same message from different groups, this increases the producers' faith in that message:

> Hearing consistent messages is important, and partnerships will help this. If the Environmental Farm Plan and Ducks Unlimited are saying the same things, producers will trust that information more.

Incentives

All extensionists mentioned the importance of incentives for increasing adoption. The most cited examples in terms of financial incentives were the Canada/Alberta Farm Stewardship program, the Alberta Environmental Farm Plan, Alberta Environmentally Sustainable Agriculture, and paying for Environmental Goods and Services. Two extensionists also talked of the importance of non-financial incentives such as signs for drive-ways that single out the good practices of a producer, awards from the county, and other such symbols of appreciation and acknowledgement.

Type and Amount of Information

Many key informants raised the issue of considering the type and amount of information that is being distributed, including consideration of complexity, relevance, overload, and the role of producers in extension.

Complexity of Issues

Three extensionists criticized the tendency of extension as it is currently practiced to simplify complex issues in order to make programs. One extensionist contended that extension needs to spend more time dealing with the complexity of these agricultural issues instead of always simplifying, while another stated:

> If we want to have an impact, we need to realize this stuff needs to be multidisciplinary. We need to take into consideration the sociological, the economic, and the psychological.

Later in the interview, this same extensionist added:

> Complexity is a truth to this stuff, but our programs assume a certain level of simplicity in order to deal with problems. In reality, these issues are quite complex, and when extension assumes it's simple, or acts as if solutions are simple, this lessens our effectiveness. Extension is like the saying, 'There is an excess of simple answers, but a shortage of simple problems.'

Relevance

Four extensionists commented on the need to make extension relevant to producers. It was argued that they need to understand 'why' the proposed practice change is important for their good.

One extensionist stated:

> The future is getting producers to understand the connection between agricultural production and environmental sustainability.

Overload

There was agreement among all extensionists that producers operate in an information rich environment. One extensionist commented on the need to provide not more information, but rather a different sort of specific information on how to implement all of the practices that producers have already heard about. This extensionist felt that specific, practical steps towards adoption were still lacking for producers:

> I am still dealing with a broad message on a broad level, but they are looking for specifics on how to make it happen in their businesses. They are looking for simple steps that they can take. This is another level of information that we could be getting out there.

Role of Producers

All extensionists indicated a need to involve producers at earlier stages of the extension process. One extensionist summarized this sentiment by paraphrasing what one of his clients had said to him, "We need to do it with them, not to them."

Three extensionists used the term 'grassroots' to communicate their impression that if extension was to be effective, it would have to have the buy in and support from producers, which meant they would have to have a greater role in the process.

Another extensionist stated:

> Extension people need to spend a lot more time figuring out what producers want; to talk with wide groups of producers. And we need to make the process accessible to them; have travelling workshops; take it on the road, and make it local.

One extensionist also stated government "policies haven't encouraged this sort of local action," as can be seen by the lack of funds the government has provided to support local engagement. He noted, however, that Alberta Environment has recently put some funding towards supporting local watershed groups, which he sees as a positive sign.

Personal Aspects

Key informants also touched on how the personal can play a role in the practice of extension, and specifically, how tradition and building relationships are two areas that need to be considered by extensionists.

Tradition

Four extensionists raised the issue of dealing with tradition, and the challenge of changing practice and not just attitudes. One extensionist commented:

> There are family operations with older generations where they've been doing things a long time, and see no need to change. With these families, change won't come until grandpa is gone.

A different extensionist felt that this meant dealing with producers' "fear of change."

Two extensionists commented on the tradition that can occur on the part of extensionists, as well. One commented that both extensionists and producers can "get stuck in a rut." The other extensionist used tradition to explain why he felt some options receive less attention than they might merit:

> We are ignoring organics in favour of agribusiness. We are not responding to consumer demand. This is probably partly due to tradition – there are enough people in agriculture who came up with those old school methods.

Another extensionist, speaking specifically of food safety issues, commented:

> There are those who are reluctant, hoping it will go away – that it is just a fad. Or, you get those who say, 'No one's ever died eating my food,' and so they

> think everything is okay. You get those women who have been making food for church events their whole lives, and they just don't understand the need.

Building Relationships

Six extensionists communicated the need to build relationships in order to foster the environment necessary for meaningful extension.

One extensionist explained that, "You have to build relationships with producers before you can build credibility."

Others argued that maintaining relationships with producers was an important means to understanding needs of producers.

> If extensionists are able to get out there and deal with them one-on-one, this is the best way. When we can build relationships, take time, and talk face-to-face, they are more likely to adopt. This is so important.

Another extensionist commented:

> We need to listen sincerely to producers, and not give the impression that we are listening. The 'Ag Summit' is a perfect example of a forum that started with a whole bunch of pre-determined answers.

Worldviews

One extensionist raised two distinct issues that both relate to an idea of one's worldview. First, he commented on the challenge of having to work against an older way of viewing nature:

> In Alberta, we still have a pioneering mentality that says we have to conquer and improve the land. We are breaking up native pasture, knocking down trees, and draining wetlands.

Later, he raised the example of a producer he is familiar with. This producer was a conventional farmer who experienced some serious health problems due to stress. He continued:

> He decided then that life is too short. He took a holistic management course, sold off some land to get out of debt and he got into custom grazing. Some might think he is impoverished, but he chose lifestyle over SUVs; a lot aren't willing to do this. We need to re-define 'success,' and what having a 'happy life' means.

4.3.2 Themes related to the "Big Picture" in Extension

Table 6. Big Picture in Extension.

'Big Picture' Themes in Extension
1. Policy 2. More focus on the consumer 3. Need for more science 4. Objectivity

Policy

Key informants raised a number of issues that pertain to government policy regarding extension, including its commitment to extension, the short-term nature of many extension programs, and the lack of coordination between different extension programs.

Government's Commitment to Extension

All extensionists discussed the challenges of practicing extension without the support of the government. Extensionists explained that there has been a decreasing emphasis on extension by policy makers, although five did mention recent signs that this might be changing somewhat.

> The government's withdrawal from extension – financially and in terms of people – was the biggest factor influencing extension in Alberta. The government gives up and expects others to pick up the slack, without lending any support to ensure that happens.

Extensionists communicated the sentiment that they were left without any clear commitment or vision that could provide focus to their practice:

> There is just no coordination of extension over all. There is no one to champion it, and there is no funding for it. It is very difficult to make a living doing extension.

A different extensionist commented that part of the problem is, "Extension takes longer than some would like it to."

Examples of improved support for extension, and indications that it might be turning in a positive direction, were programs such as Alberta Environmentally Sustainable Agriculture and the Alberta Environmental Farm Plan. Extensionists acknowledged the fact that these are getting producers to talk more about the environment now, and that both of these programs

contain elements of extension that had been lacking in the province since the big cut-backs in the 1980s.

One extensionist commented:

> I want to be optimistic. The pendulum seems to be swinging back, and the minister seems open to investing a bit more in extension. It won't go back to want I want – which is province-wide extension programs available to 90% of producers – but it will be better.

Long-term Programs

Two extensionists raised the issue of follow-up and follow through, contending that extension fails if it doesn't follow through with the programs it puts into place. One of these extensionists stated that "programs come and go too quickly, and just when they start to bear fruit, their funding is cut."

In a different context, another extensionist commented on the need to build credibility with producers, which would require extensions to stay in their role for longer periods. He felt a part of the challenge currently is that extensionists "don't stay long enough anymore."

Lack of Coordination

Five extensionists commented on the lack of a cohesive vision for the extension program in Alberta, and agriculture in general. One extensionist mentioned that the increasing emphasis on 'specialization' means no one plans in a comprehensive, integrated approach, but only for their particular sector, whether that is grain, beef, or another commodity.

As one extensionist stated:

> Everyone is doing their own little part, and nobody has a plan for what we are trying to achieve.

Another extensionist stated:

> There is piss poor extension in Alberta, really. It is all so fragmented and poor here. A meeting or an article is not extension; evaluation is critical – what do producers want? We need to use all extension tools to reach them because they all learn differently. We need repetition. But everything is so hodgepodge; there is no focal point in Alberta. For example, take up-coming events – we used to know it all, because we had 2-3 people in every county. But once we stepped out of the counties, we lost track. Now we have the Alberta Environmentally Sustainable Agriculture website, the Alberta Environmental Farm Plan has a website, there is the Applied Research websites – and they area all good websites, but there is no one website. No one is leading.

And later, the same extensionist added:

> There is definitely a need for networking between the different agriculture organizations. I don't know how this would look, but….And, I doubt there is more money coming, so we need to work more officially and efficiently. It has to be a formal structure if it's going to work; it can't be informal, otherwise it'll fall apart.

Another extensionist commented on the number of different programs with audits that now exist, and how this is becoming confusing, and both economically and logistically difficult to take part in them all (the examples this extensionist used were the Alberta Environmental Farm Plan and the On-farm Food Safety requirements). She suggested that it might be best to join these sorts of programs to simplify the process, as well as to compensate for costly practice changes.

A different extensionist suggested that a place to start in terms of finding a focal point for extension in Alberta would be to stop trying to help producers increase their yields, but instead to help them find efficiencies, to help get more money back to them.

One extensionist stated his belief that partnerships would be one way to ensure that producers are hearing consistent messages.

Focus on the Consumer

Four extensionists suggested that extension should focus more attention on the consumer. As one extensionist stated, "If the market demands something, producers try to respond."

Another stated:

> Extension should focus more attention on the consumer, to use them as another means for encouraging producers to improve practices, but also to encourage them to celebrate the good things producers are already doing. Also, it is important the public knows that producers aren't looking for hand-outs. Consumers need to learn about how much it costs to make food well, and what this cheap food trend is doing to agriculture. We need to vote with our dollars.

Science and Extension

One extensionist called for more science to back up the practices that are being promoted by extension:

> There is not a lot of scientific basis for knowing how much of these conservation practices will help the environment. The riparian buffer of 15m is a bit of a random number – should it be more, or less?

Another extensionist also suggested that more science is needed to measure the progress that has been made in recent years:

> I am a little more optimistic than I was before, but I would still like to see another water quality/agriculture study. We had one in 1998-99, but we need another one to see if we've made any progress.

Objectivity

The question of objectivity in extension was raised by eight of the extensionists. The most common discourse was in regards to the difference in levels of objectivity and perceived objectivity between public and private extension.

> One of the values of an extension program by Alberta Agriculture is it tends to be impartial extension that provides information that allows producers to examine an idea and see how it applies to them. This is very different than private extension, which is trying to sell a product.

Another extensionist raised the example of private extensionists encouraging farmers to grow corn, which can be a high risk, high cost and low yield proposition for producers. This extensionist felt that some private extensionist has put their bottom line ahead of the well-being of producers.

A different extensionist raised the comparison of extension between Canada and the United States, stating that Canadian extension is perceived as more politicized because it comes from the government. This extensionist contended that extension in the US was both perceived, and in fact was, more objective due to the fact that it emanates from the universities and not the government.

4.3.3 Themes Related to Agriculture

Table 7. Agriculture Themes.

'Big Picture' Themes in Agriculture
1. Policy 2. Sustainable agricultural practices 3. Future of agriculture

Policy

All extensionists commented on government policy and how this affects agriculture.

One extensionist commented that some policies have the unintended effect of prolonging the problems facing the agricultural sector:

> A lot of the grants and programs out there will often prolong a problem. The GRIP [Gross Revenue Insurance Program], for example: it kept everybody in farming when the purpose was to allow them to diversify because Crow was going to be taken away. And everybody is growing wheat so there is no market for it, yet the government keeps throwing money at them to keep them going – this just allows people to keep doing what they were doing.

A different extensionist talked about the fact that Alberta currently does not have a wetland policy, but it needs one:

> We still need to work at eliminating perverse incentives. People are still draining wetlands; they are just calling it water management now.

A third extensionist felt that the industry wide emphasis on production is an impediment for the sustainability of the family farm and the environment, and would ultimately decrease the sustainability of these. This extensionist stated that producers are trying to get big, because it is all they think they can do to keep their operations viable.

Other extensionists echoed the concerns about always pushing to encourage producers to increase production, become more efficient, and increase yields:

> We focus so much attention on production that we've now produced so much, and we've wrecked the market. We thought we had to produce more, but it's not true. The type of information we are giving out could change. It has been: production, production, production; but what [are] the economics of such practices? The goal should be to produce a viable agricultural industry where we consider environmental, economic and people needs.

Yet another extensionist:

> We've helped increase production so much that now we produce too much, so the prices have dropped so much. We don't need to help them produce more, but to gain on efficiencies – we need to get more dollars back to them.

Another extensionist argued that the sustainability of the family farm should be a policy goal, since large operations can not necessarily be the focus of an ecologically sound agriculture:

> We need to emphasize the need for farming that can be done in an ecologically sound manner. Cultivating large areas is about as bad as you can

> do, even though there are ways to mitigate against these impacts – there is knowledge out there about how to reduce impacts.

In a different vein, another extensionist commented on the fact that policy also has to take into account the demands being made on producers, especially when one considers all the different requirements a producer might be made to meet:

> It could be a full time job just trying to keep up with all of the government's requests.

All extensionists did communicate a certain level of optimism, with many giving examples of new policies that seem to be going in the right direction. The most common examples of positive policy change included reference to: the Water for Life Strategy, Alberta Environmentally Sustainable Agriculture, the Alberta Environmental Farm Plan, and the Canada/Alberta Farm Stewardship Program.

Sustainable Agricultural Practices

Two extensionists raised concerns about the chemical use in agriculture. One of these raised concerns with chemical use as it affects water and riparian areas, which according to this extensionist were issues not being dealt with adequately. This extensionist also called for another water quality in agriculture study to measure progress in improving practices in terms of agriculture's effects on water. Both of these extensionists called for greater attention to the role that organic agriculture can play in Alberta's agricultural sector. One extensionist explained:

> If we produce food without chemicals we will reduce productivity, but we will be increasing sustainability and profitability. It is obvious that if they can use fewer inputs, their profitability will increase.

One of these extensions applauded the progress that has been made in terms of reduced tillage, and the environmental benefits this has produced, while at the same time communicating a level of uncertainty at the impacts of zero tillage, direct seeding and chemical fallow. This extensionist reiterated the benefits from such practices, but also expressed concern over what isn't known about the consequences of the inputs required for zero tillage and chemical fallow.

Environmental Goods and Services

Three extensionists stated their belief that finding a way to market Environmental Goods and Services would be an important step to increasing the level of conservation adoption. As one extensionist summed it up:

> If society subsidizes agriculture it will want some environmental benefits out of it.

One example of a step in this direction was the need to label appropriately, in order to highlight food that was produced using good farming practices.

Cheap Food

Three extensionists made reference to the 'cheap food' phenomenon. One posed the question:

> But what is the future of farming? This is beyond the control of producers, but we have to ask if society will keep subsidizing this industry when they can buy New Zealand beef for cheaper than we can produce it here.

Another extensionist stressed the importance of educating consumers to the true cost of their food:

> It is important the public knows that producers aren't looking for hand-outs. Consumers need to learn about how much it costs to make food well, and what this cheap food trend is doing to agriculture. We need to vote with our dollars.

Future of Agriculture

All extensionists raised questions regarding the future of agriculture. Some raised concerns that at the current pace, the future of agriculture might see more large corporate farms and fewer family farms.

Four extensionists suggested alternatives to the standard system of agriculture. Two of these suggested that organics should be given more attention and consideration as a viable and sustainable form of agriculture.

The other two extensionists suggested that alternative distribution systems such as farmers' markets and farm-direct marketing are possibilities for getting more money back to producers.

In all instances, however, it was stated that more extension would need to be undertaken to help producers affect these sorts of profound change.

Agriculture in Dire Straits

Four extensionists discussed their impression that producers are facing very difficult circumstances. One extensionist commented:

> They are working on such low margins. It is unfortunate that agriculture is in the state that it is, but it's clear that these people are capital rich and cash poor.

Another said:

> The fact that we focused so much on production in the past means we now produce too much, and so the prices have responded accordingly.

A third extensionist commented:

> A lot of people are asking questions right now, and it is apparent that they are struggling with the question, 'Should I get out now, or wait a little longer?'

In terms of being able to adopt conservation practices (which were the focus of this extensionist), the fourth extension said:

> Many producers would be willing to adopt these practices, but there is just no money to do it.

4.3.4 Motivators and Barriers

Extensionists were asked what they considered to be the motivators and barriers to adoption of conservation and food safety practices. The list is shown in Table 8.

Table 8. Motivators and Barriers from Extensionists' Perspectives.

Motivators	Barriers
Profits and economics	Tradition
Personal health	Economics
Public pressure and the market	Uncertainty (of costs and effectiveness)
Recognition	Fear
Crisis	Skills of extensionists
Skills of extensionists	Information overload
Repetition	Time
Increasing awareness of issues	Perverse incentives
Relevance	Complexity and difficulty

5. DISCUSSION

The following discussion summarizes and explains the main findings from Chapter 4, and makes linkages to Chapters 2 and 3.

5.1 PRODUCER TYPES AND WORLDVIEW

A key finding for our study was that producers can be categorized not only by commodity, geographical, or other typical aspects, but also on farming styles (or producer types) and worldview. Three types of producers emerged from the sample that were corroborated in some of the extension interviews and focus group comments: *conventional*, *alternative* and *status* producers. These producers were recognized by their differing opinions regarding the use of chemicals, and/or their disposition towards standard agricultural practices. Conventional and alternative producer types are consistent with other research into conservation adoption in agriculture, and the status type builds on Bourdieu's' and others notion of 'status capital.' For example, as discussed in the literature review, research carried out with 382 farmers in southwestern Saskatchewan by Abaidoo and Dickinson (2002) recognized 'conventional producers,' 'alternative' producers, and an intermediate or 'mixed' group combining elements from both conventional and alternative producers. Abaidoo and Dickinson (2002) based their producer types on producers' adherence to a list of specific practices, with the primary distinction between conventional and alternative producers being the use or non-use (respectively) of chemicals in one's operation. Likewise, Salamon et al. (1997) classified producers as 'conventional' and 'sustainable' based on their adoption or non-adoption of environmentally informed management practices, and Howden and Vanclay (2000) also used and tested a categorization of producers based on practice. Also, Bourdieu's theory of habitus and field (1990) was influential in the categorization used in our study, combined with that used by Abaidoo and Dickinson (2002). All the status producers sampled in this project were otherwise 'conventional' producers, but in another sample there could certainly be status producers who are otherwise 'alternative'.

The findings from our study both support and further the research carried out by Abaidoo and Dickinson (2002), specifically in terms of how producer types and worldview are associated. Abaidoo and Dickinson found that producer type and worldview were closely matched, with alternative producers expressing beliefs consistent with the New Environmental Paradigm and conventional producers those of the Dominant Social Paradigm (although there were exceptions). In our study, alternative producers often expressed a worldview consistent with the New Environmental Paradigm, and conventional producers mainly communicated a worldview moving toward the Dominant Social Paradigm on the worldview continuum – this is consistent with Abaidoo and Dickinson (2002). However, unlike their study which showed most in the mixed category leaning toward the Dominant Social Paradigm, ours found that the majority of conventional producers (42 of 55) tended towards a 'mixed New Environmental and Dominant Social Paradigm,' while only five producers had strong tendencies to the Dominant Social Paradigm. This divergence between those sampled by Abaidoo and Dickinson and those sampled for this research is somewhat surprising since one would expect a certain amount of similarity between producers in southern Saskatchewan

and southern Alberta. Could these differences be due to the time that has lapsed between the two studies (data for this study was collected in 2006, while data for their study was collected in 1995-96)? While it may have something to do with our smaller sample size, it is also possible that in the intervening time environmental beliefs and values have changed in rural communities.

Regardless, this finding is significant for a number of reasons. First, the fact that the majority of producers sampled represent such a mixed worldview highlights the unique place that producers hold as actors at the societal-nature interface, working closely with aspects of each. Unlike the conventional producers sampled by Abaidoo and Dickinson, the producers in our sample had more nuanced feelings regarding the rights and value of plants and animals, as well as humanity's role in nature. This is clearly shown by the number of conventional producers expressing a 'mixed' worldview, whose eco-driven ethics seemed to conflict at times with other statements that fell more clearly into the Dominant Social Paradigm. In conversing with the respondents, it seemed likely that much of this contradiction came from the fact that producers were answering these sometimes *seemingly* abstract questions about nature and society in a way that linked to direct experience – i.e. from a position not at all abstracted.

When asked if nature has value for its own sake, a producer might have answered positively, and then a moment later deny that all plants and animals have value and deserve protection for their own sake. This producer may have pictured and remembered invasive species (many from Europe) that he or she has spent a lot of time and energy in trying to control. This sort of 'on the ground' perspective makes a scale such as the worldview scale a very different exercise for a producer than for many other members of society, especially as compared to those who live in the city. It is only sensible that their responses should be filled with nuance.

This finding is also significant – and promising for extensionists and conservationists who hope to work with producers to manage agricultural landscapes sustainably – since the majority of producers, in this sample at least, already have a worldview that acknowledges rights and values to nature, as well as humanity's embeddedness within nature. That these beliefs are already widespread likely means that these producers are open to conservation and will adopt conservation practices if possible. The question then becomes are they able to adopt these practices, or do other barriers exist that are preventing them from acting in a manner consistent with their beliefs? This question will be discussed in more detail below, but a part of it can be discussed here, for it is apparent that one important barrier in adoption of conservation practices relates directly back to this question of beliefs and values.

5.1.1 Beliefs and Adoption

For the sample studied in this research, it is clear that there is a divergence among producers as to what 'nature' is, and therefore, what 'conservation' should be, and what should be conserved. This study did not specifically and systematically address the beliefs and values that producers hold in regards to nature – for example, we did not ask producers to explain their idea of what nature is, and what is important to safeguard in nature. Nonetheless, it was apparent from the worldview scale, and from discussions carried on between the researcher

and the respondents, that some producers viewed nature very differently than expected. One example of this is apparent in how many producers will speak of the importance of caring for the 'land.' At first glance this statement might seem to emanate from a conservation ethic. But what if this statement is in regards to the land specifically, or its ability to grow food? Is this still a conservation ethic, or is it a good farming mentality that will allow this producer to stay on the farm into the long-term? Taking care of the soil to ensure that it continues to grow crops can be argued to be a utilitarian view of nature, and more in line with the Dominant Social Paradigm. There could certainly be conservation benefits that accrue from such a mentality, but is it fair to equate the 'health of the land' with conservation, especially if other measures of biodiversity and ecological sustainability (such as species richness, species abundance, habitat diversity, etc.) are not included in this definition of the 'health of the land'?

Throughout this project, the issue of wildlife was seldom raised. There were no questions that directly surveyed producers' views regarding wildlife, but there were a number of opportunities for producers to raise wildlife issues on their own. Only two respondents (of 64) on the survey mentioned their fondness for different wildlife species (and they went so far as to list some species of interest, such as bluebirds, chickadees, moose, and coyotes) on their land. In the St. Paul focus group, many participants spoke fondly of wildlife, but overall this was not an issue for discussion in this project. The most common discussion regarding wildlife arose from one of the statements on the worldview scale regarding the value of all plants and animals, and the tendency was to talk of those unwanted wildlife (or pest) species such as 'gophers,' coyotes, badgers, and weeds.

Producers have every right to construct their version of nature as they see fit, and given their unique relationship between nature and society it is likely that their version will differ from many other members of society. However, it is important that researchers, extensionists and conservationists – and the 'city-dwelling' public overall – understand what this version is. It is likely that a lot of the tension and misunderstanding that currently exists between producers and non-producers stems from this issue. Extensionists, researchers, and conservationists are likely to adhere to a view of nature and conservation that is premised on issues such as biodiversity and watershed values, and if these views are not shared by producers, discussions of conservation will likely not progress as planned. In other words, a different version of 'what nature is' and 'what needs to be conserved' can be a significant barrier to adoption of beneficial management practices. Successful extension and conservation programs should not underestimate the significance of such a simple question as one of definition and belief. This applies not only to conservation but also to issues of food safety since as discussed below many of these issues overlap. If those proposing actions do not understand what producers believe, in terms of what safe food is, or what nature is, it is likely that these beliefs will serve as a primary roadblock to meaningful discussion.

As experienced in the highly transparent focus groups conducted for this research, meaningful discussion should be the goal. For researchers, extensionists, and conservationists who have their own ontology and desired outcomes, the tendency can become one of trying to find out how to convince 'them' of doing what is 'right' when it should probably be trying to understand what roadblocks are hindering communication.

5.1.2 Zero tillage

Zero tillage represents an interesting example of how beliefs can pose interesting challenges for extension and conservation. Specifically, for many conventional producers zero tillage seems to have become synonymous with conservation to the point that during many interviews it was apparent that respondents were basing their responses on their experiences with zero tillage when the question being posed was in regards to conservation in general. Zero tillage provides some important environmental benefits, such as reducing soil erosion and retaining moisture, but it is clear that conservation is more than zero-till. Despite this, many producers were hard-pressed to think of any other conservation practices they could adopt since they had already adopted zero-till. Consequently, it seemed a common assumption that when the researcher spoke of conservation, many felt he was referring to zero tillage.[8]

In terms of an extension success story, zero-till should certainly be heralded. In the past 20 years it has gone from a hard-to-sell innovative practice to the new 'conventional' agriculture. There are undoubtedly still many lessons to be learned from this process. Yet, if producers are hard-pressed to think of what else can qualify as a conservation practice suitable for their operation, there remains much work to be done. A sizeable minority (31%, n=62) of survey respondents could not think of *any* agricultural practices that caused them concern for the health of the land, the water, or their family; 19% (n=64) had not taken any steps in the past three years to reduce their impact on the land, water or their family; and 53% (n=58) had not heard of conservation practices that they did not adopt. Of the 81% (n=64) who had adopted a conservation practice in the last three years, the majority had adopted zero tillage.

This would indicate that the idea of conservation needs to be further developed, with greater detail provided to producers in order to draw clear linkages between agriculture and its effects on the ecology of any given geographical area. If a significant proportion of producers cannot think of what else they could do to manage for conservation, or if their view of conservation is limited to only a few examples of practice change, those promoting conservation must feel that they still have a long road to travel. It certainly might be that this is a result of a concerted effort by those proposing conservation; namely, to focus on very few specific but important conservation practices in order to increase the adoption of these practices. If this is the case, it is probably worthwhile to re-visit and evaluate this strategy or trend. Is conservation well served by being simplified? Has the health of agricultural landscapes improved since the inception of these newer conservation minded extension groups? Is there a difference between the extension strategies of government extension versus non-government extension, in terms of conservation, and if so what are the pros and cons of each? What should be the next steps for those proposing conservation, and how can past experience in conservation extension (such as in the case of zero-till extension) help guide future extension efforts (i.e., what have we learned)?

[8] The next most common assumption was that he might be talking of reducing chemical inputs.

5.1.3 Extension based on Producer Types

Using these producer types can provide extensionists with an opportunity to hone specific programs for a given audience. This research has shown that alternative producers do not generally access government extension services due to a feeling that these extension providers do not have the alternative information they need. Extensionists could choose to adjust their practice in order to better provide for the needs of these alternative producers (if they feel this is warranted). The conventional producers exhibited nuanced beliefs towards nature and conservation, which means that they should be somewhat open to conservation practices, at least in a general way. Conventional producers seldom mentioned wildlife or biodiversity as an important element of their operation, however, and so extensionists could focus more attention on these issues when dealing with conventional producers since biodiversity is the ultimate goal of any conservation program. If conventional producers are not concerned about biodiversity, or don't see its relevance to their operation, what does this mean for conservation in agricultural landscapes? The status producers in this sample were all conventional producers (although in another sample there certainly could be alternative and conventional status producers) who were very critical of all information. They critiqued practices that they themselves followed (such as zero tillage), and communicated frustration at extension programs that simplify issues in order to sell a practice. When dealing with these producers, extensionists would be better served to explain in a more nuanced and detailed way the pros and cons of a given practice. While simpler might indeed be better for some audiences (such as conventional producers), with status producers extensionists will likely find more success in presenting the complexity in questions of conservation and food safety beneficial management practices.

5.2 FORMS OF CAPITAL

This project has been premised on an understanding that the adoption of conservation and food safety beneficial management practices is not only an issue of economics, but also consists of social, cultural, demographic, behavioural, and other considerations. Following the theory of habitus and field as explained by Bourdieu (1990), we were sensitive to the numerous forms of capital that producers could access in order to achieve their goals: namely, economic, social, cultural, and status capital.

The findings indicate that alternative producers rarely access community meeting places, and that some feel that their form of agriculture is not as well respected as the conventional form. Not only did all of the alternative producers indicate a level of detachment from community social networks, but they also communicated a lack of support from the standard information systems, such as government extension programs, which do not provide the alternative information that they require for their businesses. All of these producers except for one (7 of 8) did communicate social ties to those outside of their community, or where they could go for information, but the fact these alternative producers are left to their own devices does pose some important questions for extensionists.

Social capital refers to all of those social networks that one has to draw upon in one's field, while cultural capital refers to those tastes, and the agreed upon 'right and wrong' way to

farm and ranch. Alternative producers have reduced access to both of these forms of capital in their immediate communities, specifically when it comes to questions of farming and ranching (one producer mentioned that she was respected in the community, just not for her farming practices), and perhaps also in terms of their standing with the government information and regulatory departments that they could claim to have a right of access to.

The question for extension, then, is should a right and wrong way to farm and ranch be endorsed, and if so, how is this 'way' to be decided, and by whom? The simple answer to this is that the very role of extension is to endorse a right way to farm and ranch – this is the message that extensionists work to distribute to producers. Who then should be deciding what is right, and how can alternative systems of agriculture be better incorporated into these extension services? Or should they be? It could very well be argued that extension should focus its attention on helping to define those accepted practices for the majority of producers (conventional producers), and the minority, the alternative producers, should continue to function as they have been – by working within the social and cultural networks and fields that they have chosen to associate with.

This research repeatedly heard how extension is slowly re-building itself after severe cutbacks in its operating budgets (which occurred in the 1980s). With limited financial and labour resources, is could be difficult to justify a move to focus attention on a segment of the agricultural population that might only account for 10% of all producers (a number referenced in Abaidoo and Dickinson, 2002). Then again, it could be argued that fostering diversity within the agricultural sector is crucial if we are to plan for sustainability in agriculture; diversity not only in terms of commodity types and marketing venues, but also in terms of the systems of farming and ranching that are present in the province. Morgan and Murdoch (2000) comment on the growing demand in the United Kingdom for organic food, and how the United Kingdom has been unable to meet its own demand because its agricultural sector has lost the capacity and knowledge necessary for growing food organically. Perhaps supporting alternative systems of agriculture, such as organic or biodynamic farming, could prove beneficial in the future.

Should extension choose to better incorporate the needs of alternative producers into their programs, or whether they choose to focus their energies and resources on the majority instead of the minority is simply a matter of policy, preference, and capability. In any case, it is a decision that should be taken consciously.

The last form of capital expressed by Bourdieu is status capital, and this form of capital was best encapsulated in our sample by the practices of the status producers who managed their operations in a way that could be summarized as maximizing efficiency; their yards, machines and driveways were immaculate, and these producers adopted practices that could be said to be at the leading edge of agricultural practice (e.g., using GPS and aerial photos to aid in their management; following the advice of soil scientists to pinpoint management needs, and to stay ahead of best practice trends; etc.). Status capital is an important consideration for extensionists and conservationists in that it undoubtedly has an impact on the practices of other producers (both conventional and alternative) – but, are these impacts positive or negative in terms of encouraging the adoption of conservation and food safety

beneficial management practices? For example, does having immaculate yards, driveways and weed-free fields mean that one is managing their operation in a conservation-minded or food safe fashion? With status comes an evaluation of what is ideal or desired: how do the practices of those with status contribute to sustainable agriculture? Should their practices be deemed the ideal; are these practices those that extensionists and conservationists hope to see adopted by the majority of producers? Or, framed in another way: can those with access to status capital be a resource for extensionists? Should they be?

By approaching adoption issues with a fuller understanding of the different forms of capital that producers draw upon to meet their operating and personal needs, extensionists and conservationists will be better placed to understand barriers and motivators to adoption, and to adjust their extension programs accordingly. For example, cultural capital – or the tastes one holds in terms of farming; the 'right and wrong' of farming – is not immutable, but is something that has been created through past extension programs, and through the personal and social experiences of producers. The right way to farm changes, but those who are abreast of these changes are able to draw upon the capital they have earned – they are 'in the know' and so are empowered because of this. Extensionists need to understand what the current right way to farm is, and then they need to evaluate how this way measures up in terms of conservation, food safety and sustainability. If there are elements of this practice that are deemed inappropriate then steps should be taken to change this idea of agriculture, and this change will be made easier if situated within an understanding of the other forms of capital that surround this cultural capital. Specifically, the social capital available to a producer can either hinder or encourage the adoption of this 'new' way to farm, depending on the nature of the social networks the producer is a part of. As well, economic, status and natural capital will all interact with one another, and therefore aid and/or complicate this process of adoption and adaptation.

Although acknowledging this complexity might seem daunting, accounting for the different forms of capital can be a useful tool and exercise for extensionists. By taking each proposed practice change and situating this within the social environment of a given community, taking into consideration the way people 'see' farming, as well as understanding the economic, status and natural resources that producers have at their disposal to affect change, extensionists will succeed in improving the relevance and adaptability of extension programs for these producers.

5.3 CONSERVATION AND FOOD SAFETY BENEFICIAL MANAGEMENT PRACTICES

Throughout this study, the adoption of conservation and food safety beneficial management practices have been treated together as two facets of the same issue. There was an underlying assumption in doing so that these two branches of extension shared similar challenges in encouraging adoption, and that the motivators and barriers would be similar enough to allow discussion of them both at the same time.

The findings show many areas of overlap between the conservation and food safety realms; many motivators and barriers are indeed similar between the two. However, key differences should be recognized. The researchers feel that this collaborative effort between these two

different areas was important and should be continued in the future, primarily for the benefit of the producers, but also to increase effectiveness in extension delivery. In order to do this, the following distinctions should be considered.

First, many of the social factors affecting adoption apply for both conservation and food safety beneficial management practices. In fact, producers often raised issues that could have fit into both categories. For example, when the topic of food safety was raised, a number of producers asked if that meant using pesticides on their crops, an issue which could easily have been discussed under the banner of conservation.

This research found that the following social factors are relevant when discussing both food safety and conservation adoption:

- Practicality and suitability
- Economics
- Tradition
- Fear and emotion
- Relationships with extensionists
- Beliefs and values

Discussing food safety did raise some items that did not seem to be of issue when speaking of conservation practices, such as:

- Many are unclear what food safety means
- Food safety can be a dry topic for discussion
- Dealing with food safety often means meeting legislated regulations

Unlike conservation, confusion about what food safety referred to was often encountered among producers whenever the topic of food safety was raised. While conservation has surged ahead in the consciousness of producers and consumers alike, food safety seems to be still in its early stages of diffusion. The fact that conservation and food safety are at these different stages poses challenges for those who wish to discuss them together, but these challenges are not insurmountable. In fact, by better combining food safety issues with those of conservation, it is likely that food safety will diffuse at a faster pace, and reach a larger audience due to the pervasiveness of conservation extension.

Another issue that was raised in regards to food safety, but not to conservation, was that food safety could sometimes come across as dry and boring. This means that extensionists dealing in food safety information will have different challenges than those dealing in conservation, where the discussion can often become heated and animated quickly. One extensionist commented that in order to successfully communicate food safety information, it is necessary to have engaging speakers who understand their audience, and know how to make information accessible and relevant to producers. This is certainly true for all types of extension, but this extensionist felt that with food safety it was even more so.

Lastly, food safety seems to be publicly endorsed, resulting in an increasing amount of regulations and legislation. This has both advantages and disadvantages, since it means that producers will eventually *have* to adopt many of the food safety practices being discussed. However, as has been shown in numerous agricultural studies, producers tend to react negatively to legislated practice change. Will there be a backlash towards food safety beneficial management practices as more commodity groups become regulated? If so, how will this affect the adoption of non-regulated conservation practices, especially if the two areas come to be delivered in greater collaboration?

5.4 MOTIVATORS AND BARRIERS TO ADOPTION

When asked about barriers to adoption, the most common responses had to do with financial or technological considerations – specifically, one's level of debt, inadequate revenues (or a lack of financial incentives), unsuitability of the practice to one's operation, and uncertainty about whether it would work. The financial barriers were expected to be those that producers would bring up most frequently, but a key project goal was an understanding of those 'other' variables that prevent producers from adopting. The fact that technological considerations should be placed among the most important barriers to adoption is a finding consistent with other research into the adoption of beneficial management practices (see Pannell et al. 2005; Vanclay 2004). It also confirms the recommendations of those who call for greater consideration of the technological appropriateness of beneficial management practices (see Table 25 in Appendix 8 for a full breakdown of responses). This 'appropriateness' does not stem simply from the technological capacity of a practice, but also from several other aspects: the ability of that technology to match the social needs of a producer, including the producer's ability to easily use and repair the technology; the technology's trialability and the visibility of the technology's impacts; and the technology's consistency with what the producer considers the right way to operate a successful farm or ranch. Technology in this sense is meant to include not only purely 'technological' innovations, but also all those practices and systems that are proposed to producers as food safety and conservation beneficial management practices.

Some producers (31%, n=63) also indicated that a lack of personal benefits was a barrier to adoption. Approximately 24% (n=63) of respondents indicated that adopting environmental improvements was not a priority, and that conservation practices were too complex (23%, n=64), while 14% (n=63) indicated that their family was not supportive of adopting environmental improvements. A few respondents (22%, n=63) felt that the agencies and people proposing conservation practices were not trustworthy. While these numbers cannot be said to represent a wider population beyond those sampled in this project, it does give an indication of the diversity of barriers as expressed by some respondents. It is clear that, for some, economic barriers were not the only factors affecting non-adoption.

5.6 COMPLEXITY

This study has highlighted how complex adoption issues can be. It is clear that economic factors have an important role to play in the adoption of conservation and food safety beneficial management practices, but so do institutional, ecological, and social factors. The great challenge for those proposing these practices lies in knowing how to deal with such complexity, especially when a natural and practical tendency in extension is to deliver simple messages that can be successfully incorporated into practice. While this question can seem somewhat rhetorical, it is likely a question that should be given considerable attention since the credibility of extension and conservation is directly related to extension's ability to balance between the need for simplicity and need to account for complexity. For example, the risk of simplifying extension efforts today is that in the short or long-term such straightforward 'solutions' will be seen to have been too simplistic, and this will raise doubts about subsequent extension. Just like extensionists and conservationists are dealing today with 'mistakes' made in the past, messages being delivered today will be used to evaluate the credibility of extensionists in the near future.

The most salient examples to emerge from this research can be seen in the practices of chemical use and zero tillage. This project team agreed that questions of chemical use would not be addressed because of the possibility that this could upset many producers and potentially lessen the effectiveness of this study. Despite our reticence, 56% of producers raised the issue of chemical use on their own accord, meaning although this issue may be controversial and complicated, it is one that producers want to discuss. If extensionists were to shy away from this topic for the sake of simplicity, this could affect their credibility down the road. Likewise, zero tillage has been clearly and successfully endorsed by extension efforts, and while this should be viewed in a positive light due to the obvious benefits that derive from this practice, from the information gathered during this research it seems little extension has been done in terms of highlighting the unknowns and complexity of zero tillage. This complexity was raised by a number of producers as well as one key informant. The danger in not accounting for this complexity now is that in the future extension might be dealing with the effects of this current practice, and its credibility might be affected if it is seen that its endorsement of zero tillage was too enthusiastic.

One example of a producer who is aware of the complexity in some of these issues came from a mixed farmer from southern Alberta who practices zero tillage and chemical fallow, as do the majority of his neighbours. At one point in the interview, between two questions, he raised the issue of organics as a comparison to his practice of chemical fallowing. On his own prompting, completely without the researcher's prodding, he began to debate the merits of each, often correcting himself and continuing a free flow of ideas that he had obviously considered in depth many times. His conviction was that chemical fallowing is the best practice he could adopt for keeping the soil on the ground – which was important to him since he lives in a dry area prone to blowing – even though he didn't think chemical fallowing was always good for the environment. He acknowledged his uncertainty on whether 'organics' were a better way to go, maintaining that he had made the decision he thought was best for the land and for his operation. Being witness to this personal debate regarding his choice of practice, it was apparent to the researcher that, for this producer, the environment is a large priority for farm management decisions, and many issues are not as

clear cut as one would like. The challenge for extension should be to account for this level of complexity while still delivering a clear and coherent message that can be readily integrated into practice. Not an easy task, but an important one nonetheless.

5.7 COMMUNITIES OF INTEREST

This research was inspired by the desire to better understand what social factors act as motivators and barriers to the adoption of conservation and food safety beneficial practices. An extension of this question was a desire to document how these motivators and barriers vary between different communities of interest, such as commodity groups, geographical locations, and those who practice farm direct marketing. As the research project and methodology evolved, and the door-to-door sampling methodology was agreed upon, it was clear that the final sample size would not be large enough to allow for quantitative analyses. The project team chose the qualitative methodology for a number of reasons (see below), but in doing so limited the ability of this particular project to adequately address questions on these communities of interest and their adoption behaviour. Despite this shortcoming, some tendencies for Alberta were found in our household sample and other techniques used, and many of these tendencies will likely be tested with more quantitative methodologies in the near future.

5.7.1 Geographic Location

Due to the late start to the data collection component of this project, the northern and central regions of Alberta were sampled less than the southern region. Or rather, by the time the researcher was in the northern and central regions producers were too busy to participate in the survey, and so the response rate decreased. This unequal sampling based on location means that it is difficult to draw out possible tendencies related to location. From the respondents sampled, however, it was apparent that location did not seem to play as large a role as the researchers had anticipated. The issues raised in the south were also raised in the central and northern regions, and there did not appear to be any significant differences in terms of disposition to conservation, levels of knowledge, or approachability. In other words, in changing region, the researcher did not feel as if he were beginning anew, but that he was continuing to hear more of the same that he had heard before. It is important to reiterate that due to the small sample size (especially for the central and northern regions) there is no way to corroborate this observation, but it is being included here since it is at least true to the researcher's experience in this project. Further research that rigorously tests geographical location against conservation adoption and attitudes might yield some interesting results that this project was not able to pick up on.

5.7.2 Commodity Type

As with geographic location, this research was not such that an in-depth study of commodity type could be tested against adoption behaviour. The only significant tendency that emerged from this sample was related to livestock producers and their tendency to disagree that the

government should be responsible for ensuring the responsible use of the environment. Again, this finding should be taken with caution since this sample is too small to assure statistical significance; yet, it does indicate the tendency of those in our sample.

5.7.3 Farm Direct Marketers

Only 20% of respondents (n=64) indicated that they practiced farm direct marketing, but these respondents seemed very conscious of food safety and conservation issues in their practices, likely attributable to the direct contact of these producers with their consumers. More work needs to be done to ascertain the economic, social and environmental impacts of farm direct marketing, since our research suggests that this alternative form of commerce represents a unique subset of agriculture that warrants more specialized attention. In this sample, of the 13 respondents who practiced farm direct marketing, approximately half were conventional producers and half were alternative producers. Likewise, half of the farm direct marketers sampled communicated a tendency towards the New Environmental Paradigm, while the other half fell into the mixed New Environmental and Dominant Social Paradigm. These numbers are far greater than in the sample over all, where alternative producers accounted for only 13% of the sample, and those tending towards the New Environmental Paradigm represented only 27% of the sample (n=64). The large presence of these alternative and environmentally-minded respondents in the farm direct marketing realm suggests that farm direct marketers are a unique group of producers. Because farm direct marketing represents many elements of sustainability as seen in the literature (such as the creation and maintenance of social and human capital, diversifying local economies, and perhaps a tendency to manage for conservation and food safety issues more closely), this is an area that should be given individual attention by researchers.

5.8 LESSONS LEARNED FOR EXTENSION

In terms of extension, many methodological lessons have been learned through this research. It is important to note that characteristics of producers and consumers alike should be considered when using any of these methodologies. This section will touch on some of these, and a summary of methodological pros and cons has been provided (see Table 9).

5.8.1 Conducting Face-to-face Surveys

Our survey was conducted using a face-to-face sampling methodology that had both pros and cons. Advantages of this technique include that it ensured that a certain number of correctly completed surveys was obtained, since the researcher was personally available for the respondent to ask questions. It also avoided privacy issues encountered through obtaining phone or mailing lists. The face-to-face survey provided us with an ability to talk more closely with producers about conservation in a way that most (quantitative) surveys have not done. These highly personal surveys proved to be an incredibly important component of the quality of this project's data. Not only was it apparent that the quality of the data was

improved (by reducing misunderstanding on the part of respondents, with some questions), but being present with the producers also proved to be a rich source of data.

On the other hand, this technique had its limitations. It was labour-intensive and time-consuming, hence expensive. Due to the late start of the survey fieldwork, (approximately the second week of March) combined with a rapid snowmelt and early seeding times, we were faced with visiting many houses in which the occupants were either away or reluctant to be interviewed during a busy time of year. It also suffered from the same degree of survey saturation that many other researchers often complain about. Again, however, this was somewhat mitigated by the surveyor presence to relieve concerns about survey intrusiveness and build a degree of trust.

Another limitation of our face-to-face methodology was that it was set up like a typical quantitative survey. We used a 10-page questionnaire with structured questions (see Appendix 2), which most likely made our job more difficult. For producers accustomed to (but increasingly frustrated) with lengthy and 'impersonal' surveys, it is likely that a more informal approach would be better received. For example, some producers might have felt more at ease if a researcher arrived to 'talk' with them as opposed to showing up 'to ask a bunch of questions.' This could have been done using an informal, semi-structured interview guide that need not even be on paper (but which the researcher has memorized), with the conversation being recorded onto tape, or by the researchers taking notes during (or directly after) the 'interview.'

Just 'showing up at the door' had its drawbacks - for example, many people were not home and the long travel was for naught - but this still seemed to work better than phoning ahead. This latter approach was also attempted during this project, but it appeared that people were more likely not to answer if they suspected an unknown caller. Putting a face to the research proved very helpful over the course of this project, and was certainly our methodological strong point.

In summary, while sitting down to talk with producers seems to be the best way to get *quality* information from producers about farming and ranching, this also poses some important issues. For example, it is costly to personally survey enough producers to satisfy the sample size needed for a quantitatively valid study (i.e., to achieve statistical significance). Another alternative would have been to conduct a quantitative survey, but results from this project indicate that many producers are 'burned out' from surveys. In other words, many (if not most) feel they are being surveyed too much, and they are starting to opt out of responding. This poses a challenge not only for those doing mail-out or phone surveying, but also for those doing door-to-door surveys (whether for quantitative or qualitative surveying).

5.8.2 Conducting Focus Groups

The St. Paul focus group session was a great success. All of the things that a researcher would hope to happen in a focus group seemed to happen here. Participants were able to 'get some issues off of their chests,' people openly debated controversial topics, and research questions were given thoughtful responses. Also, despite the fact that the logistical set-up of

the focus group was a difficult process (due almost exclusively to the poor timing of the focus group, which happened during the busiest time of year for producers), the focus group proved to be a way of quickly accessing producers and getting meaningful data.

The Fairview focus group session went well, but perhaps not to the same extent as the St. Paul focus group session. This may have been partly due to the differences in topics. In St. Paul, the discussion focused on conservation and general farming issues, while at the Fairview focus group the discussion dealt almost exclusively with food safety issues. This was purposefully arranged. Nonetheless, the more specific topic questions in Fairview limited the amount of free debate compared to St. Paul, where the topic was more open and the subject matter at a more conservational level. Food safety beneficial management practices may be harder to discuss at a philosophical level, which was what was occurring at the St. Paul focus group. Other important factors that could have influenced the outcome of the Fairview focus group were the fact that the project researcher did not take the time to go over the questions carefully with the facilitator, thus leaving room for misinterpretation in terms of understanding what each question was hoping to achieve. More effective communication between the facilitator and the project researcher should have been a priority. As well, two different facilitators were used for the two focus groups. Using the same facilitator for each focus group would have been preferable since this increases familiarity with the topics at hand, as well as the anticipated results from each question and from the research project overall. It also allows time for the researcher and the facilitator to develop a rapport, which can aid in communication and planning. In hindsight, only one facilitator should have been used for the two focus groups to improve effectiveness and efficiency.

5.8.3 Age and Background

Various factors seemed to play a role in how well the researcher was received during the face-to-face surveys. Two factors that stood out were age and ‘background.’ The latter included where the respondent had previously *lived* (i.e., always in rural areas, or with additional experience living in urban areas) and his or her *educational* background (and especially, whether or not the respondent had university training). It was much easier for the researcher to deal with younger, university educated respondents (even if these did not complete a university degree). This observation could certainly have something to do with the fact that the researcher was ‘younger’ and university educated, but to dismiss this finding as simply ‘sampling error’ (i.e., the researcher’s demographic profile) would be erroneous. In our sample, younger and/or university educated respondents were simply easier to approach and discuss issues with, and this very likely would have been the case for another researcher who was ‘older’ or from a different background.

It should be strongly stressed, however, that the researcher had some interesting encounters with respondents characterized by low levels of education, but who obviously were very intelligent and had a lot to contribute to this project. However, the most pleasant surveys to conduct (for the researcher) were those that occurred with younger and/or university educated respondents who seemed less distrustful, more open to talking, answering questions and discussing farming (and specifically conservation), and who were overall sympathetic to the researcher.

These factors could have implications for extensionists in a number of ways. First of all, if part of the researcher's comfortable interactions with these friendly respondents had to do with similarity to his age and education level (which is likely, at least in part), then the same could transpire between two individuals of an older age group and more similar background (be it educational, rural, etc.). This might mean that, in some instances, it might be worthwhile to match the extensionists' profile to the producer in question. However, it is both impractical and unwarranted to suggest that extension must go to the extreme of matching age and background between everyone who comes in contact with each other. The fact that the researcher had very good interactions with people from all age groups and backgrounds is a telling sign. While unpleasant interactions were most often with older people who had less education, or a very specialized education such as a community college course in agriculture, these brusque or unfriendly encounters may be due to a specific cultural context such as historical distrust.

Secondly, another obvious way that age and background can be useful for extensionists is in knowing that this friendlier group of respondents (younger and university educated, and/or time spent living in 'the city') might be the easier group to approach for more open discussion and debate. This may be a good way to enter into a new community with a new practice, or a good way to get local feedback on how best to approach extension in their area.

5.8.4 Timing and Logistics

It is crucial that any research dealing with producers be conducted at a time of year that fits into the schedule of producers. Specifically, it is important to conduct information gathering at a time of year when the producers have the most free time; in particular, November to mid-December and January to mid-March. Unfortunately, and due to extenuating circumstances, this project was conducted very late into the spring. The first two study areas went relatively well since producers had not reached their level of peak activity, although most mixed farmers were in the middle of calving season. This phase of the project lasted from March 15 to April 19, 2006. It took a bit of time to find a rhythm and the right time of day to sample, but once this was done the researcher was consistently able to survey 4 producers a day. Earlier in this period it took about 3 visits until the researcher found a house with somebody home, while the later the surveying went, the more difficult it was to make contact.

After April 21, the researcher moved to central Alberta and it became apparent that the survey had gone into producers' busiest time of year. Instead of making contact with a producer after three attempts, it was now taking 12 attempts to get one response. As the researcher moved north, this only worsened and it could take between 15-20 attempts to reach a willing participant. The researcher tried a variety of times to contact producers, and the most successful times varied as the survey progressed. Earlier in the spring, before the busy season, it worked best to arrive at or near 9 am. In this way two or three interviews could be fit in before lunch, and there remained enough time in the afternoon for another two or three. The researcher purposely chose *not* to disturb producers over lunch, even though some suggested this time might work best. Although producers were likely to be home during lunch, it was decided that such measures would likely contribute to the fatigue that

producers feel towards those doing surveys; i.e., every time they sit down to eat, someone calls or knocks on the door to ask them a bunch of questions. The researchers believed it was important to grant producers the respect any other working person would ask for, which includes some time to eat their lunch in peace.

As the spring progressed, and it became apparent that producers were in the field, it was found that arriving earlier in the morning worked best – before they left for the field (between 8 and 9 am), and later in the evening (between 7 and 9 pm). Again, the researcher attempted to avoid those times when the producer might be eating.

If this project would have started two weeks earlier, the response rates would have been higher and surveying would have been easier. However, as mentioned above, the ideal times for surveying and making contact with producers should be during their least busy times, if possible.

5.9 USING SOCIOLOGY IN EXTENSION

The specifics of the methodologies used in this project have been included here, with the rational for why they were chosen. For examples of other methodologies that could have been used in their place and the pros and cons of these, see Table 9. This is to provide some insight into some of the questions that need to be asked when designing a study, and to provide some options that can be used depending on one's situation.

Table 9. Methodology Pros and Cons.

	Advantages	Disadvantages
Surveys 1. Mail-out surveys	• Facilitates use of quantitative statistics • Excellent for large samples • Works better if self-addressed and stamped return envelopes are included • Relatively quick turn-around (approximately 2 months)	• Time-consuming • Expensive • Somewhat impersonal • Low response rate; need to follow-up to increase return rate above 10-20% • Need relatively 'fresh' list
2. Phone surveys	• Facilitates use of quantitative statistics • Excellent for very large samples • Very efficient	• 'Shotgun approach' to picking names may not work for producers • Expensive, but less than mail-out • Somewhat impersonal • Low response rate since considered intrusive by many
3. Face-to-face	• Ensures a certain number of completed surveys • Surveyor is available to explain difficult concepts • Excellent for qualitative data • Helps build trust	• Labour intensive • Can be quite expensive • Must be well-timed (season, time of day, etc.) • Low numbers obtained, not so good for quantitative data
4. Internet	• Relatively inexpensive • Facilitates use of quantitative statistics • Reduce analysis costs since form is downloadable	• Requires skill with designing on-line survey • Difficult to monitor who fills out • Limited to those who use Internet
Focus Groups	• Good for sharing ideas and perceptions • Can be converted into Dephi technique if 'hard' answers to questions are needed • Can be relatively representative of 'stakeholders'	• Time-consuming to organize, especially without list of participants • Can be very expensive • Requires significant facilitation expertise
Interviews	• Relatively easy to conduct • Great for qualitative data and to verify other data • Easy to build sample by 'snowballing'	• Need experience for difficult or complicated questions • Can be hard to analyze if consistency problems encountered

5.9.1 What Tools to Use and How

It will come as no surprise that picking one's methodology will be determined by the study population one wishes to sample, or make contact with, and the resources one has access to in order to carry out the research or the project. For agricultural extensionists, the most probable group being studied or contacted is a group of producers. However, taking a sociological perspective should inspire one to search out other possible groups warranting attention from extensionists, such as: 1) other practitioners of extension; 2) researchers and scientists; 3) industry representatives; 4) consumers; and 5) family, friends, neighbours, and advisors of the producers.

These other groups might warrant attention from extensionists precisely because they are often given little consideration when talking of adoption behaviour. The tendency is to focus on the producers, and to ask why 'they' don't adopt. It could be equally valuable to focus attention on the social world that adoption behaviour is situated within – with its researchers, consumers, extensionists, industry players, etc. – and to ask why or how these other groups affect adoption behaviour. For example, how do the worldviews of scientists and extensionists engaged in designing food safety and conservation programs affect adoption rates? Is it possible that low adoption might not be the fault of producers, but instead be due to the influence of another group in the adoption process?

Once the population has been chosen (that group one wishes to make contact with), one has to find the easiest and most effective means of reaching this group, and making contact. How this is done will vary depending on whether one needs a random sample from the desired population, or whether one is able to pick and choose individuals at will from the population. As seen in this study, farmers and ranchers seem to be burning out on surveys (as is the general population, overall), so this should be a consideration when designing projects. Is a survey really needed to meet project goals? If it is, and a random survey is needed, how is one going to find a reliable list from which to draw a random sample? Looking at Table 9 above, what is the survey methodology that best matches the project's needs?

The face-to-face methodology used in this study helped with gaining access to respondents (as well as eliciting more reflective responses) who would most likely have not responded to a typical survey methodology. There may be a way to utilize this sort of personal aspect in a random survey, perhaps by prefacing the survey with a personal visit from an extensionist either to explain the project or as a means to building a rapport.

All methodologies should be used in an ethical manner, and the well-being and privacy of those being contacted should be the priority. Also, the purpose of using these sociological tools should not be to extract or 'push' information (data 'mining' or marketing) to better convince people of something, but to increase one's own understanding of the situation others find themselves in. This distinction is an important one, and means that adoption questions are not necessarily about breaking down barriers in order to increase adoption, but in understanding barriers in order to design programs and innovations that better fit within the reality of those being targeted.

5.9.2 Evaluation

Having designed and executed a project using a sociological framework, how can one evaluate its success? This will certainly depend on the projects goals and deliverables, and whether one feels these have been met. Have meaningful answers been found for the questions that were posed?

It is useful as well to write up findings for peer-reviewed journals and publications, and to present these at appropriate conferences and workshops. Not only does this provide an invaluable forum for soliciting the evaluation, critiques, ideas, and suggestions of others doing similar work, but it also allows what is surely important information to circulate more widely, where it can inspire, refine, and validate work being done by others. This sort of venue is crucial for building bridges and ensuring that our knowledge related to the adoption of food safety and conservation practices will continue to increase and disperse.

6. RECOMMENDATIONS AND CONCLUSION

The research and analysis for this project has incorporated unique methodologies to address difficult questions. This section refers back to the sub-questions posed in the Introduction. The following recommendations have resulted from this research, which have also been summarized in Table 10 below.

Table 10: Key Recommendations for Adoption and Extension

Social Needs to Adoption	Extension Protocols
1. Barriers to adoption are complex, and not necessarily 'barriers.'	1. Extensionists need to recognize their own biases or worldviews and those of producers.
2. Financial aspects, while important, are not the only motivators or barriers.	2. Methodological tools need to be carefully considered and innovative approaches tried.
3. Most producers fall in the 'middle of the pack' in terms of farming styles and worldviews.	3. Use a diverse set of protocols that are both adaptable and adoptable for producers.
4. Conservation and food safety beneficial management practices share many adoption issues, yet may require different treatments.	4. Producers and extensionists alike need more discussion on what constitutes beneficial management practices.

6.1 SOCIAL NEEDS TO ADOPTION

The first question asked in this study was, "What are the key sociological motivators and barriers to adopting environmentally responsible and food safety beneficial management practices?" Four key social 'needs' or factors that emerged through this research are described below in detail, along with recommendations for agricultural policy makers, managers, and extensionists to consider.

Barriers to adoption are complex, and not necessarily 'barriers.'

1. As shown by this research, significant complexity exists in adoption issues that are difficult to manage for or predict. Access to 'capital' (economic, social, cultural, status, etc.), producer worldviews, technological, political, demographic, and ecological factors are among some of the main 'barriers' to adoption of beneficial management practices, and many of these are intertwined or dependent on each other. Some may even be in

conflict or contradictory. If such factors can be separated out, examined, and appropriately linked to relevant features, this complex mix can be better understood, turning stubborn barriers into bright opportunities.

For example, our analysis described and compared different types of capital as contingent upon demographics, producer type, or worldview. Besides economic and natural capital, both of which may be pushed separately by different agencies acting on 'behalf of' producers, many extensionists pointed out in interviews that other forms of capital or available resources in agriculture should be considered in extension policy, planning, and programming. In support of our survey results, other researchers have also found that other capitals include (but are not limited to) social capital, status capital, technological capital, leadership (or political) capital, and human capital.[9]. Extensionists may rightly concentrate on educational and training capacities if human capital is felt to be deficient. However, our analysis indicated that social capital (e.g., peer networks) and status capital (e.g., a specific producer type) also directly affect habitus (behaviours), ultimately affecting the adoption of agricultural and food safety practices. The extensionist who places an overt focus on human capital while ignoring social and status capital could be accused of having tunnel vision. In contrast, as this research demonstrates, complex forms of capital can be categorized through one of the methodologies indicated in Table 9, to determine whether they are barriers (shortage of capital) or motivators (abundance of capital). Then, these different forms of capital could be compared and specific recommendations made if some are found to be lacking for certain individuals or regions.

In short, so-called barriers cannot be considered in isolation due to the complexity that surrounds each farming style or practice. They should also be reconsidered to see if they really are barriers. For example, as our worldview and producer type analysis showed, reasons for resistance to change may lay in particular farming 'subcultures' and farming 'styles,' which should be considered as legitimate aspects of human behaviour. Our point is that barriers to adoption of beneficial management practices are often termed as such without fully understanding the underlying or complicating factors as this study has attempted to do.

Financial aspects, while important, are not the only motivators or barriers.

2. All methodologies employed in this research have confirmed what many producers have been telling extension agencies for years – 'economics' form only part of the puzzle. Our surveys, focus groups, and interviews did confirm that economic issues are still the main driver for the majority of producers. Common financial concerns brought up by many survey respondents, focus group participants, and interviewees included commodity and input prices, land costs, debt loads, credit programs and incentives or restrictions, and market competitiveness, among others. Still, our survey results also showed that

[9] The latter, which includes available skills and knowledge, is often commonly considered by agencies when programming for 'social' elements.

monetary issues are often linked or even surpassed by other key aspects such as one's cultural capital (farming style), education, or worldview. Our research confirmed findings by Bourdieu, Carolan, and others that individual behaviours or 'habitus' (e.g., worldview, human capital, tradition), and external influences or 'fields' (e.g., markets, peers, programs), both condition and direct one's agricultural practices. An understanding of both spheres of action is needed for a given agricultural or food safety policy or program targeted at producers.

In brief, while potential financial gain can serve as an incentive for producers to conduct beneficial management practices (conversely, potential losses may be a disincentive), our results suggest that this so-called incentive is not a given. It can be counter-balanced by time, lifestyle, family, land tenure, risk, policy, or many other factors. For example, our focus groups and survey results showed that distrust is also a barrier for those that feel misled by government policies and programs (e.g., livestock producers). Several extensionists also felt that more emphasis is needed on the social aspects of farming, ranching, and food safety, including institutional, demographic, and attitudinal factors, for a more holistic approach.

Most producers fall in the 'middle of the pack' in terms of farming styles and worldviews.

3. Three types of producers (or farming styles) emerged from our survey sample, which were corroborated in some extension interviews and focus group comments: conventional, alternative, and status producers. These producers were recognized by their differing opinions regarding the use of chemicals, attitudes, and/or their disposition towards standard agricultural practices. Conventional and alternative (generally organic) producer types are consistent with other research into conservation adoption in agriculture (e.g., the Saskatchewan article by Abaidoo and Dickinson 2002), and the status type builds on the notion of status capital as illustrated by Bourdieu and others. In this latter and relatively small but potentially influential group, producers may maintain their status through their large size, immaculate yards (with large, well-maintained gravel driveways), many bins, and their business-like, efficient operating style. They feel they have something to show the community. It is worth noting that status producers may be either alternative or conventional producers, but they stand out by actions meant to show they are the best of the pack in their specific community and/or sector. It is worth noting that these actions may *not* necessarily translate into sustainable or beneficial management practices, although they may sincerely hope this is the case.

   While extremes were noted, our surveys clearly showed that an intermediate or 'mixed' producer group, which combined elements from both conventional and alternative producers, was by far the largest (78%, or 50 of 64 respondents). Likewise, most respondents (86%, or 55 of 64) communicated a worldview that combined beliefs from opposing ends of the spectrum: the New Environmental Paradigm and the Dominant Social Paradigm. This means that any efforts taken to pigeonhole producers by their

farming styles or attitudes are not so straightforward. It also means that Alberta producers, at least by our relatively small sample, seem to fall largely in the 'middle of the pack.' This should be good news for extensionists since it may be much harder to work with those holding rigid or narrow beliefs, no matter at which point of the pro-profit vs. pro-environment scale they feel themselves belonging to.

Conservation and food safety beneficial management practices share many adoption issues, yet may require different treatments.

4. Despite their differences, conservation and food safety beneficial management practices were considered as distinct yet interrelated components, and collectively studied for this research. This could be construed as a unique approach. Yet, since food safety aspects - production, processing, packaging, storage, and distribution - directly affect both environmental and human health, it seems only natural to look at these practices as two sides of the same coin. This research found that the social factors most relevant when discussing both conservation and food safety adoption are practicality and suitability, economics, tradition, fear and emotion, relationships with extensionists, and beliefs and values. Adequately combining food safety issues with those of conservation could help diffuse food safety practices more quickly, and reach a larger audience due to the pervasiveness of conservation extension.

   Still, unlike the seemingly more straightforward conservation practices, confusion was often encountered among our survey respondents whenever the topic of food safety was raised. Few respondents seemed to appreciate that many of their practices involve food safety. A minority (20%) of respondents were engaged in farm direct marketing, and these clearly have particular food safety perspectives that must be considered. Yet, most likely many others surveyed also had unmentioned food safety issues. While conservation has surged ahead in the consciousness of producers and consumers alike, food safety seems to be still in its early stages of diffusion. This poses challenges for those who wish to discuss them together, although these challenges are not insurmountable. Another issue raised was that food safety sometimes comes across as dry and boring. Also, food safety is increasingly publicly endorsed by new or improved regulations and legislation. Producers will eventually have to adopt many of the food safety practices being discussed. However, as has been shown in numerous agricultural studies, producers tend to react negatively to legislated practice change. This could lead to a backlash towards food safety beneficial management practices as more commodity groups become regulated.

   Our point is that food safety issues are not isolated from agricultural, environmental, socio-economic, or other perspectives. Rather, they should be integrated with these other areas of concern in a deliberate and sustained manner. In other words, food safety is interrelated with all farm-based activities, and agencies working in this area should find

ways to collaborate for the well-being of producers, but also to increase efficiencies in extension. Still, while conservation and food safety beneficial management practices share many adoption issues, these practices may have to be treated separately in some circumstances. Extensionists dealing in food safety information will have different challenges than those dealing in conservation. For food safety extensionists, it may mean contracting engaging speakers who understand their audience and know how to make food safety information accessible and relevant to producers. Lastly, the consumer side of food safety may provide even greater opportunities for, say, farm direct marketers, to engage with than those producers presumably not engaged in food safety.

6.2 EXTENSION PROTOCOLS

The second question asked in this study was, "How does an understanding of the social needs of producers affect extension and the protocols it should use to promote adoption of conservation and food safety beneficial management practices?" Four key extension protocols or considerations that emerged through this research are described below in detail.

Extensionists need to recognize their own biases or worldviews and those of producers.

1 Two considerations regarding agricultural worldviews can be summarized from our study. First, the survey results showed that every producer has a particular worldview towards farming or ranching. This worldview - whether environmentally-driven on one hand or profit-oriented on the other (or more likely a complex mix of both, but perhaps leaning to one side) - will have a major influence on ones' practices. It makes sense then, that, each particular worldview be acknowledged and respected by extensionists, and appropriate steps taken to deal with them. Potential 'barriers' can translate to opportunities for targeted programmatic efforts. Second, as discussed above, each extensionist and the agency they represent also have their own worldview, whether openly expressed or not. This point was emphasized during extensionist interviews and project team meetings. In some cases, the particular perspective of an extensionist may chafe with that of certain producers in a given region, and the approach taken may cause further rifts to develop in some cases. For example, an environmental regulatory agency may disapprove of the needs or views of a financially driven, large-scale grain operator whereas an agricultural department may offer little support for a family motivated, small-scale pork producer. It may not be an easy task to genuinely consider alternative worldviews and to collaborate effectively with those holding such views, especially if fundamentally different from one's own. The matter is complicated even more so if combined with a lack of institutional support to encourage developing working relationships with these 'other' worldview holders. However, as appreciated by many of those interviewed for this study, discussing and appreciating others' views is a necessary step to building trust and successfully achieving policy or programmatic goals and objectives.

We recommend that each extension institution have a strategic plan to assess and account for various worldviews for improved effectiveness. An individual producer assessment may be best accomplished through an informal, individual chat combined with methodical note-taking and subsequent analysis. These friendly talks would preferably occur on-site at the producer's household or 'in the field.' If quantifiable data is required for comparative or strategic purposes, a more traditional survey approach could be combined with direct observation of specific operations (e.g., farming styles, yard appearance, care of on-site natural areas). In certain scenarios, a specific group may need to be assessed, in which case the extensionist could employ group tactics, preferably by an expansion of the individual approach. Other tools are discussed below. Whatever the case, the savvy extensionist, assuming institutional support and flexibility exist, will adapt his or her approach(es) to carefully consider the 'worldviews' encountered.

Methodological tools need to be carefully considered and innovative approaches tried.

2 Extensionists should consider both new and 'tried and true' tools for acquiring information on producer needs and perspectives. Our research, with its mixed-methods approach, suggests that different tools are needed for different ends. A carpenter wouldn't use a drill to hammer in a nail; likewise, extensionists must select the 'right' set of tools customized to match the circumstances. Many agricultural and conservation agencies rely on attitudinal surveys to obtain useful information to develop or support specific policy and program initiatives. However, this research has shown that structured surveys have serious limitations, including intrusiveness, respondent 'burn-out,' costliness, and an overt focus on quantitative, 'stats friendly' data at the expense of more meaningful understanding. While all forms of surveys have their weaknesses, two forms of surveys are recommended for extensionists looking for more meaningful information; the first is based on direct experience in this project, and the second has been recommended by other researchers in other contexts.

Face-to-face surveys. As we found by 'knocking on doors' over the space of two months in late winter/early spring, face-to-face surveys have the big advantage of helping to build trust and share concerns in a non-threatening space (i.e., someone's porch or kitchen). Moreover, crucial observations can be made about 'non-visible' items such as yard orderliness, farm equipment condition, and environmental aspects (to list only a few examples). Personal data can often be obtained such as body language and facial cues as reactions to questions or comments, which would be impossible over the phone or through mail-out surveys. Emotions may be perceived that imply trust or dismay, important 'cues' to controversial or crucial questions. Nevertheless, on the negative side, besides labour cost and critical timing issues, entry may be difficult. Some people do not appreciate home visits from strangers, and the extensionist may be seen as interfering in their practices, especially if neutrality is in question or if they have misgivings about government officials or 'environmentalists'; both of these negative perceptions or 'surveyor labelling' were encountered in our field research. Rejection rates could be

lessened by a phone call beforehand to arrange the visit, although this may not always be feasible or people may choose not to answer the phone. Timing the home visit at non-busy periods of the day, week, or season will also help to gain acceptance. In general, however, for the reasons listed here, we highly recommend that extensionists consider face-to-face surveys or meetings whenever possible, especially if meaningful data and trust-building are desired.

Internet surveys. While this project did not conduct an Internet survey, past experience has shown this to be a very effective tool if dealing with a specific issue involving certain professionals or other members of a well-defined group or network that rely on computers for regular communication. It also employs a 'data-friendly' approach so that the information entered by an individual is easily analyzed. Still, until communication technology improves (as well as its adoption) in rural areas, Internet surveys are not recommended for producers if a wide-ranging scale of 'random' respondents is desired.

Besides surveys, interviews, or other approaches, if an agency wishes to 'listen to' varying perspectives and opinions on a given set of issues, our research has shown that well-prepared focus groups of 5-12 people can be a very effective approach. These should be held with an experienced facilitator to achieve maximum effectiveness, such as ensuring a reasonable quality of discussion and equality of 'voices' around the table. The same facilitator should be used for all focus groups if conducting comparative research. Above all, public extension agencies (as opposed to 'for profit' groups) should avoid the tendency to treat focus groups as a 'testing' or 'marketing' tool. Instead, an effective focus group organized by extension agencies should be treated more as a 'data gathering' tool to discuss and debate, collect, and analyze opinions on a short list of issues or questions. It should be participant driven as much as possible to build trust and ensure openness. The key is to 'just let them talk,' taking care that participants stay on topic and clarifying any confusing areas. This looser yet structured approach would allow for greater comfort and freedom for the participants, while at the same time providing valuable information for extension agencies.

Use a diverse set of protocols that are both adaptable and adoptable for producers.

3 This research has demonstrated that extensionists should not be constrained to one set of protocols (tools or practices) when working with producers in Alberta. Every producer's set of circumstances is unique (geography, farm structure, crop/livestock type, family needs, producer type, worldview, etc.). This wide variety of producers with often conflicting attitudes, even on presumably similar questions as was experienced in our survey with our 'middle producer' worldview, means that extensionists need to rely upon and customize a wide diversity of protocols. These should be practical, better than what came before, have proven benefits, and conform with producers' ideas of the 'right' way to farm and ranch. Extension protocols should be adapted or fine-tuned to each special set of circumstances, and whenever possible, combined with other tools or practices to ensure reliability and increase effectiveness.

Our survey analysis also indicated that different extension delivery instruments may have to be used for different kinds of producers. As the Canadian media expert Marshall McLuhan famously stated, "the medium *is* the message." For example, those with higher incomes or educational levels may prefer highly structured or 'technical' workshops and the Internet to get their extension information. Others seem more amenable to the use of Call Centres or radio. While not studied in this research, it is likely that all of these mediums, when used on their own, are likely less effective than when combined with diverse approaches to 'get the message out.' Likewise, extension should not resign itself to only a limited set of practices that are meant to represent 'conservation'. Conservation is too complex to be met through one or two practice changes, and the circumstances of producers too diverse.

Whichever protocols are selected, the extensionist must make difficult trade-offs in factors such as cost, training, complexity, time, and effectiveness. Flexibility, responsiveness, and an ability to deal with complexity in extension is a must, given the wide variety of issues and producers as our survey encountered. In some cases, for more independent-minded folk (such as some ranchers) or relatively isolated producers (as was often the case, for example, in Special Areas), the extensionist should try an individual and open-ended approach. Informal chats at the farm or ranch household can 'break the ice' or deal with controversial topics. Group approaches (focus groups, community dinners, Town Hall meetings) may work better when dealing with like-minded producers with similar worldviews, or if genuine deliberation is desired by sponsoring agencies.[10]

Producers and extensionists alike need more discussion on what constitutes beneficial management practices.

4. Our methodologies found substantial agreement on what constitute beneficial management practices (with the important exception of alternative producers) although this may not be what some agencies or individuals would like to hear, especially those concerned with the use of chemicals. For example, according to many interviewees and survey respondents, zero or reduced tillage is now the new 'right' way to farm. Many respondents also equated zero or reduced tillage with conservation, which raises concerns that conservation messages might currently be over-simplified, given that spraying to eliminate weeds generally accompanies zero or reduced tillage (as does continuous cropping, according to some respondents). Weed control retains a high exchange value in terms of cultural capital. In other words, as some respondents noted, and confirmed by other research as noted in Chapter 2, those with weedy fields may not be perceived in a positive light. Producers' negative perceptions of weeds can have consequences on their own practices as well as how they judge the quality of other farms and alternative

[10] For related research on deliberative or public engagement tools for natural resource managers in Alberta, see Mitchell and Parkins, 2005.

farming practices; this could have serious implications for the ability of extension to successfully sell its alternative practices.

This is a key issue for extensionists, producers, and even consumers. Most conservation or agricultural agencies seem to be promoting the use of zero or reduced tillage and spraying systems for their soil maintenance, moisture retention, and carbon sequestration benefits, as well as reduced machinery time (hence, noise level reduction, which may have positive benefits for wildlife too). In contrast, some producers (especially those in the alternative category but also several in the conventional category) feel that the use of herbicides is highly detrimental to both soil and human health. Likewise, consumers are increasingly looking for products that offer at least the perception of a healthier lifestyle, including organic foods.

Other examples mentioned for this research concerning what constitutes beneficial management practices include managing for biodiversity and wildlife. However, most survey respondents did not bring these issues up at all. Those that did generally spoke of wildlife 'pests' such as coyotes, badgers, and gophers.

What we are saying is that consistency is needed on information delivery for what is considered a 'good' beneficial management practice, and why. How will the 'social needs' of those holding minority views be addressed? Exactly what constitutes sustainable or beneficial management practices is not so clear when categorizing producers. While our study shows that conventional producers seem to have a nuanced understanding of nature and society, which is good news for conservation proponents, more work needs to be done to understand how producers define nature and how this translates into the practices they adopt. The number of conventional producers in our survey who expressed a 'mixed' worldview is an example of this ambiguity. Complicating the issue is the fact that some conservationists might adhere to a view of nature that is premised on issues such as biodiversity and watershed values, but which could be contrary to some producers and agricultural extensionists. In other words, contrasting versions of 'what nature is' or 'what needs to be conserved' can be significant barriers to adoption of beneficial management practices. Dissimilar beliefs will serve as a primary roadblock to meaningful discussion if those proposing actions choose to disregard what producers believe is 'right.' As discussed above, this also means that extensionists representing different 'worldviews' need to work more closely with each other to ensure that the messages being diffused to (or discussed with) producers do not necessarily have to contradict each other. In many cases, these disparate views may have significant overlap and similar ends.

In conclusion, this research has demonstrated that the agricultural community is not homogenous, and solutions to address barriers to adoption of conservation and food safety beneficial management practices are not straightforward:

> Farmers can be categorised on every single variable that can be logically considered in conjunction with agriculture. This means that there are no single

> problems, no single solutions, no single extension strategies, and no best medium that extension should solely utilise (Vanclay, 2004, p. 214).

While our research has taken some important steps in improving an understanding of producers, along with the tools that extensionists wish to use, we also acknowledge that much remains be done. At minimum, this analysis on rural social needs has shown the existence of certain 'groupings' of producers. However, these groupings should not be simply based on crop/animal type or operational mix, location, or other such 'technical' or 'situational' aspects, most of which have so often been used for categorization purposes in the past.

Instead of trying to categorize Alberta's producers by their specific type or place of operation, many of the answers for agricultural extensionists appear to lie in the diverse attitudes and beliefs of producers. This also includes their interactions or 'fit' within specific communities and regions, industry, and public agencies. It is in this rich but less understood arena of personal perspectives and social networks that extensionists in Alberta should focus their continued efforts for the adoption of conservation and food safety beneficial management practices.

7. REFERENCES

Abaidoo, Samuel and Harley Dickinson. 2002. Alternative and conventional agricultural paradigms: Evidence from farming in southwest Saskatchewan. *Rural Sociology*, 67(1): 114-131.

Adadi Ghadim, Amir K. and David J. Pannell. 1999. A conceptual framework of adoption of an agricultural innovation. *Agricultural Economics*, 21: 145-154.

Alberta Department of Agriculture. 1905, 1906, 1907, 1908, 1909, 1911, 1912, 1915, 1918, 1922, 1932, 1938, 1948, 1950, 1969, 1972. Annual Reports.

Baerenklau, Kenneth A. 2005. Toward an understanding of technology adoption: Risk, learning, and neighborhood effects. *Land Economics*, 81(1): 1-19.

Baker, Harold R. 1987. Future Options and Prospects in Rural Extension and Technology Transfer. Occasional papers in rural extension, No. 1, University of Guelph.

Beus, C.E. & Dunlap, R.E. 1991. Measuring adherence to alternative vs. conventional agricultural paradigms: a proposed scale. *Rural Sociology*, 56: 433-460.

Black, A.W. 2000. Extension theory and practice: A review. *Australian Journal of Experimental Agriculture*, 40: 493-502.

Bourdieu, P. 1990. The Logic of Practices. Cambridge, UK: Polity Press.

Carolan, Michael S. 2005. Barriers to adoption of sustainable agriculture on rented land: An examination of contesting social fields. *Rural Sociology*, 70(3): 387-413.

Clearfield, Frank and Barbara T. Osgood. 1986. Sociological aspects of the adoption of conservation practices. *Soil Conservation Service:* Washington, D.C.

Department of Alberta Agriculture. 1972, 1974, 1975, 1976. Annual Reports.

Featherstone, Allen M. and Barry K. Goodwin. 1993. Factors influencing a farmer's decision to invest in long-term conservation improvements. *Land Economics*, 69(1): 67-81.

Feder, Gershon and Dina L. Umali. 1993. The adoption of agricultural innovations: A review. *Technological Forecasting and Social Change*, 43: 215-239.

Flett, Ross, Fiona Alpass, Steve Hmphries, Claire Massey, Stuart Morriss and Nigel Long. 2004. The technology acceptance model and use of technology in New Zealand dairy farming. *Agricultural Systems*, 80: 199-211.

Fraser, Evan D.G. 2004. Land tenure and agricultural management: Soil conservation on rented and owned fields in southwest British Columbia. *Agriculture and Human Values,* 21: 73-79.

Giannakas, Konstantinos and Jonathan D. Kaplan. 2005. Policy design and conservation compliance on highly erodible lands. *Land Economics*, 81(1): 20-33.

Guerin, L.J. and T.F. Guerin. 1994. Constraints to the adoption of innovations in agricultural research and environmental management: A review. *Australian Journal of Experimental Agriculture*, 34: 549-571.

Habron, G.B. 2004. Adoption of conservation practices by agricultural landowners in three Oregon watersheds. *Journal of Soil and Water Conservation,* 59(3): 109-115.

Hall, Alan. 1998. Sustainable agriculture and conservation tillage: Managing the contradictions. *Canadian Review of Sociology & Anthropology*, 35(2).

Howden, Peter and Frank Vanclay. 2000. Mythologization of farming styles in Australian broadacre cropping. *Rural Sociology*, 65(2): 295-310.

Kim, S., J.M. Gillespie and K.P. Paudel. 2005. The effect of socioeconomic factors on the adoption of best management practice in beef cattle production. *Journal of Soil and Water Conservation,* 60(3): 111-120.

Kington, E.A. and D.J. Pannell. 2003. Dryland salinity in the Upper Kent River catchment of western Australia: Farmer perceptions and practices. *Australian Journal of Experimental Agriculture*, 43: 19-28.

Marra, Michele, David J. Pannell and Amir Abadi Ghadim. 2003. The economics of risk, uncertainty and learning in the adoption of new agricultural technologies: Where are we on the learning curve? *Agricultural Systems*, 75: 215-234.

Marsh, Sally P. and David J. Pannell. 2000. Agricultural extension policy in Australia: The good, the bad and the misguided. *The Australian Journal of Agricultural and Resource Economics*, 44(4): 605-627.

Mitchell, Ross E. and John R. Parkins. 2005. "Practitioner's Guide to Deliberative Practices in Natural Resource Management." *Natural Resources Canada*, Canadian Forest Service, Northern Forestry Centre, Edmonton, AB. Inf. Rep. NOR-X-407. 26 pp.

Morgan, Kevin and Jonathan Murdoch. 2000. Organic vs. conventional agriculture: Knowledge, power and innovation in the food chain. *Geoforum*, 31: 159-173.

Murdoch, Jonathan and Judy Clark. 1994. Sustainable knowledge. *Geoforum*, 25(2): 115-132.

Murdoch, Jonathan and Mara Miele. 1999. 'Back to Nature': Changing 'Worlds of Production' in the food sector. *Sociologia Ruralis*, 39(4): 465-483.

Napier, T.L., M. Tucker and S. McCarter. 2000. Adoption of conservation production systems in three Midwest watersheds. *Journal of Soil and Water Conservation*, 55(2): 123-134.

Pannell, David J. 1996. Lessons from a decade of whole-farm modeling in western Australia. *Review of Agricultural Economics*, 18(3): 373-383.

Pannell, David J. 2001. Dryland salinity: economic, scientific, social and policy dimensions. *The Australian Journal of Agricultural and Resource Economics*, 45(4): 517-546.

Pannell, David J., Graham R. Marshall, Neil Barr, Allan Curtis, Frank Vanclay and Roger Wilkinson. 2005. Understanding and promoting adoption of conservation technologies by rural landholders. Unpublished manuscript, submitted to *Australian Journal of Experimental Agriculture*, http://www.general.uwa.edu.au/u/dpannell/dp0502.htm.

Raedeke, Andrew H., Sandra S. Hodge and Corinne Valdivia. 2003. Farmers, the practice of farming and the future of agroforestry: An application of Bourdieu's concepts of field and habitus. *Rural Sociology*, 68(1): 64-86.

Rahelizatovo, N.C. and J.M. Gillespie. 2004. Factors influencing the implementation of best management practices in the dairy industry. *Journal of Soil and Water Conservation*, 59(4): 166-175.

Robinson, Jill R. and Ted L. Napier. 2002. Adoption of nutrient management techniques to reduce hypoxia in the Gulf of Mexico. *Agricultural Systems*, 72: 197-213.

Salamon, Sonya, Richard L. Farnsworth, Donald G. Bullock and Raji Yusuf. 1997. Family factors affecting adoption of sustainable farming systems. *Journal of Soil and Water Conservation*, 52(4): 265-271.

Silva, Evandro do Nascimento. 2003. The conservation of beneficial arthropods in agricultural landscapes: A challenge for the success of sustainable agriculture. *Endangered Species Update*, 20(4-5): 179-187.

Soule, Meredith J., Abebayehu Tegene and Keith D. Wiebe. 2000. Land tenure and the adoption of conservation practices. *American Journal of Agricultural Economics*, 82(4): 993-1005.

Supalla, Raymond J., Roger A. Selley, Sally Bredeweg and Darrell Watts. 1995. Adoption of nitrogen and water management practices to improve water quality. *Journal of Soil and Water Conservation*, 50(1): 77.

Tavernier, Edmund M. and Vic Tolomeo. 2004. Farm typology and sustainable agriculture: Does size matter? *Journal of Sustainable Agriculture*, 24(2): 33-45.

Toma & Bouma Management Consultants. 2004. Technology transfer in Canadian agriculture. Prepared for Agriculture and Agri-Food Canada, Ottawa.

Traoré, Namatié, Réjean Landry and Nabil Amara. 1998. On-farm adoption of conservation practices: The role of farm and farmer characteristics, perceptions, and health hazards. *Land Economics*, 74(1): 114-127.

Turrell, Gavin and Ingrid McGuffog. 1997. Rinsing practices of Australian farmers: The Characteristics of farmers who do not rinse chemical residues from empty containers. *Journal of Environmental Management*, 50: 129-146.

Tweeten, Luther. 1995. The structure of agriculture: Implications for soil and water conservation. *Journal of Soil and Water Conservation*, 50(4): 347.

Valdivia, Corinne and Christine Poulos. 2005. Factors affecting farm operators' interest in incorporating riparian buffers and forest farming practices in northeast and southeast Missouri. *AFTA 2005 Conference Proceedings*.

Vanclay, Frank. 2004. Social principles for agricultural extension to assist in the promotion of natural resource management. *Australian Journal of Experimental Agriculture*, 44: 213-222.

Warriner, Keith G. and Trudy M. Moul. 1992. Kinship and personal communication network influences on the adoption of agriculture conservation technology. *Journal of Rural Studies*, 8(3): 279-291.

Wilson, Geoff A. 1997. Factors influencing farmer participation in the Environmentally Sensitive Areas Scheme. *Journal of Environmental Management*, 50: 67-93.

Appendix 1. Summary of Agriculture Extension in Alberta

The history of agriculture extension in Alberta dates as far back as the history of our province. In the Alberta Department of Agriculture's 1906 Annual Report, the Minister wrote:

> The Department is of the opinion that one of the best works it can do for the farmer is to put him in possession of the latest and most improved methods of pursuing his work and of preparing and marketing his products. Having this knowledge he then is in a position to make the best of the situation.

The first annual reports from the Alberta Department of Agriculture contained sections on "Agricultural Educational Work." Most of this work involved holding stock judging schools, which were very popular in the province. At summer fairs, the department took advantage of the presence of large numbers of people to provide instructional work through setting up demonstrations in tents. For example since noxious weeds were a big concern in the early years of agricultural development in Alberta, a tent was set up that displayed mounts of various plants, and farmers could discuss methods of control with the weed inspectors.

In 1905 then Chief Weed Inspector Mr. T. N. Willing wrote:

> How to interest [farmers] and bring them to a sense of the folly of continuing such slovenly work is a problem hard to solve, for all must admit that good farmers cannot be made out of bad by Act of Parliament. However good the laws and earnest and conscientious the inspector there must be a spirit of co-operation on the part of the farmer before satisfactory results are attainable. It then remains for us to pursue educational measures and show that as a business proposition it will pay the farmer to avoid letting weeds occupy large portions of his fields to the exclusion of profitable plants. (Alberta Department of Agriculture, 1905, p. 24)

To this end weed inspectors would take note of farms with an over-abundance of weeds and make efforts to visit those farms in the early spring to discuss with the farmer various control methods. They would also leave bulletins and leaflets with the farmers that described the weeds so farmers would know how to recognize them. When the inspectors realized that many farmers did not know the provisions of the Noxious Weeds Act, they posted them in hotels, schools, post offices, etc. so farmers could not plead ignorant to the law. In 1917, a 130-page illustrated weed bulletin was published and sent out across the province to help farmers identify weeds on their properties.

In 1906, a "traveling school" was held in a special train that traveled from town to town and showed farmers the finer points of stock judging and seed judging. There was already a similar train operating in eastern Canada, so the Department of Agriculture decided to seize upon the popularity of the idea and establish one in the province. The train initially had two cars set up as classrooms, as well as one sleeper and one dining car, so the speakers could

stay on the train as it traveled from town to town. In 1907, the traveling school was held again, but this time one of the train cars carried 50 head of stock, and proved so immensely popular with the farmers that the Department had to make extra provisions to accommodate all of the people that showed up for the training sessions. This method of extension was extremely popular and grew bigger every year. By 1912, the "Mixed Farming Demonstration Train" had three cars of purebred livestock, two cars of poultry equipment, a grain car, and a dairy car. There were 10 instructors, and the train made two stops a day.

> The farmers showed a great interest in the work and I do not think we have carried on any extension work in the province that has taken better with the farmers and that did the same amount of good to advance the interests of agriculture (Alberta Department of Agriculture, 1912, p. 183).

By 1916, there was a natural history car that contained mounts of all of the birds and mammals of the province, and a nursery car so women could attend domestic sciences demonstrations without their children.

Agricultural societies were continually being set up in towns all over Alberta in the early years "to encourage improvement in agriculture, horticulture, arboriculture, manufactures and the useful arts" (Alberta Department of Agriculture, 1906, p. 110). They held meetings to deliver lectures on various topics, promoted the circulation of agricultural periodicals, maintained reference libraries, held exhibitions, carried out experiments, and generally did everything in their power to promote advances in agriculture to the farmer. However, it was noted that it was difficult to get enough people to attend the meetings, as farmers were too busy in the summer to attend and in the winter getting access to towns off the railway line was nearly impossible. The Alberta Department of Agriculture's 1907 Annual Report reported that, "the more progressive farmers will always be present but those whom it is most important to reach never appear at the meetings" (p. 124).

Farmers Institute meetings were another way that new information and technologies in agriculture were being spread to farmers.

> In carrying out the work the Department has had in mind not only the dissemination of practical knowledge on various subjects directly effecting agriculture, but also the development of local talent by a discussion of the subject under treatment by those who attend the meeting. There is a great deal to be gained by bringing the ordinary farmer into touch with the more successful man in his district so that the poor farmer may become conversant with the methods employed by those more advanced. (Alberta Department of Agriculture, 1908, p. 135)

However, these meetings required a lot of work to organize and at first were not well-attended. It was noted that in addition to putting up posters announcing meetings, sending out letters directly to farmers describing the upcoming meetings was a more effective way to encourage them to attend. For example, in 1909, special attention was given to advertising farmers institute meetings to boost attendance. "The old method of scattering posters

broadcast throughout the country has not proved satisfactory" (Alberta Department of Agriculture, 1909, p. 131). Letters were also sent out to people on mailing lists that detailed what each meeting would be about and requested attendance and assistance with setting up the meetings. "It will be easily understood that with such a thorough system of direct advertising the results were highly satisfactory" (ibid). By 1911, the local newspapers were carrying advertisements for the institute meetings, and letters were again sent out to mailing lists. Along with the letters was enclosed a pamphlet which outlined the places, dates, names of speakers and topics of the meetings. This pamphlet was "one of the best methods of advertising such work. The paper used was of good quality and the folder made of such a size and shape that it could be conveniently carried in one's pocket (Alberta Department of Agriculture, 1911, p. 179). The Department was also attempting to hold meetings in towns further from the rail line, and it was felt that these meetings were better attended than meetings held in large towns because it was felt there were getting to be too many meetings.

In 1908, the first "Good Farms Competition" was held at the Red Deer Exhibition Association. Scores were based on such things as state of repair of farm buildings and fences, general order and cleanliness of house and yard, facilities for watering stock, cultivation of land, and freedom from noxious weeds. Of course fairs and exhibitions already had many small-scale competitions, as it was noted that "the real mission of Fairs being the improvement of livestock and other farm products, through the rivalry engendered by competition, it becomes absolutely necessary to have active competition from year to year to prevent retrogression" (Alberta Department of Agriculture, 1915, p. 111). In fact, providing judges to fairs and exhibitions was noted as being an extremely important facet of extension work performed by the Department throughout its history.

Two-week "short courses" in agriculture were first held in Lacombe in 1909. About 100 students attended. Farmer excursions were first run at the Lacombe and Lethbridge Experimental Farms, and were attended by between 250 and 500 people. They toured the farms led by guides who explained various activities and experiments. The following year three short courses were held, and it was decided to focus on specialized topics rather than attempting to cover all aspects of agriculture. The courses included lectures on forestry (at Indian Head) and "Birds in their relation to Agriculture." In 1911, four short courses were offered, and attendance was as high as 460 at one of the sessions. In 1912, the short courses were changed from two weeks to one week long, and included a course on "domestic science." This proved to be extremely popular and signalled to the department that "the time was ripe for a permanent provision to assist women's work on the farm and in the homes" (Alberta Department of Agriculture, 1912, p. 182). By 1916, the short courses were again shortened to three days.

Demonstration Farms were started around 1910 in Vermilion and Olds. Three Alberta Schools of Agriculture opened in conjunction with the farms in 1913, at Olds, Vermilion, and Claresholm. The schools had three main functions: to give instructions to students enrolled in the school during the winter, to carry on extension work with farmers in the summer, and to conduct experiments in the science of agriculture. Extension work included animal husbandry, mechanics, and agronomy. In 1918, "Rural Economics and Sociology were given a little more prominence with a view to aid in widening the graduates' spheres of usefulness

in his or her community (Alberta Department of Agriculture, 1918, p. 17). The College of Agriculture opened in 1919, and in 1920 three more Schools of Agriculture opened in Raymond, Gleichen, and Youngstown. Extension work now included seed germination tests, lectures at Farmers Institute meetings, and judging at town and school fairs.

In 1916, the Department decided to introduce agriculture to schools by bringing seeds for children to grow, and teaching them how to raise calves. At the end of the year the schools held a fair for the children to exhibit their plants and livestock. This was the beginning of today's 4-H clubs, as in the following years boys and girls clubs for pigs, calves, sheep, poultry, grain, etc. were formed.

In 1922, three district agriculturists were appointed in Sedgwick, Lethbridge, and Medicine Hat.

> The duties of these men are to visit the farmers in their district, coming into personal contact with them, finding out their problems, and helping to solve them…. The department believes that more assistance can be given to the farmers by appointing trained, experienced men to meet them on their own farms than by any other system. A little interest shown in [farmers'] welfare, a little help and advice in times of discouragement during the first few years will do much to hearten and cheer them, and make them contented and prosperous citizens. (Alberta Department of Agriculture, 1922, p. 16)

In the early 1920s, farmers began using the mail system and the telephone to ask questions of the new district agriculturists. In 1925, a staff member from the College of Agriculture would give an address on the radio every Monday night on a subject from his department.

An extension library was opened in the Olds School of Agriculture in 1925. It initially held 156 books and also began to catalogue newspapers and periodicals received by the school. The library would lend three books to any rural school in the province for a month, which was extremely popular.

In the early 1930s, the Annual Reports began to have a separate section on Extension Work. Field days were being held at various farms around the districts and were highly popular. Special reference was usually given to the needs of the district in which the field day was held.

> The getting together of people in the summer time, when they can drive with their cars and have a basket picnic, and in conjunction hear a number of speakers from the Department and the University, has been shown to be a popular move, especially when they are held on some good farms (Alberta Department of Agriculture, 1932, p. 19).

By 1937, field days were a cooperative effort between the provincial and federal governments, the agriculture faculty at the University of Alberta, and various agricultural associations. They were organized by the provincial director who made the schedules. By the

late 1930s and early 1940s, field days began to have a theme, such as poultry, farm engineering, horticulture, dairy, etc.

The Extension Service was organized in 1938, "to coordinate the extension activities of every branch of the Department of Agriculture. … The main purpose of the service [was] the distribution of information pertaining to agriculture and home economics, and its long time objective [was] the improvement of agricultural and rural life" (Alberta Department of Agriculture, 1938, p. 62). Its main areas of responsibility were publications and statistics, organizing field days and short courses, and judging at school fairs.

By 1940, district agriculturists were beginning to hear a different type of request from farmers: a demand for information on subjects related to home improvement, such as farmstead planning, fruit growing, ice wells, etc. Questions about more obscure topics such as electric fences, wind chargers, ventilation, and insulation were being brought to the agriculturists, showing the diversity of information and knowledge seeking from farmers. Owing to the Second World War, and the Depression of the 1930s, more farmers were adopting a "whole farm" approach to the solution of their problems, and wanted to obtain a balance in agriculture through long-term planning. An extension program in mechanics was started to show farmers the benefit to making the proper adjustments to their equipment.

"Visual instruction equipment" was used extensively by the Department in 1940. Ten film strips and five movie films were completed that year, since materials from the United States and other provinces were deemed unsuitable for Alberta conditions.

Women's extension work was quickly gaining popularity in the late 1930s and early 1940s. The objective of this work was better home living on the farm, not just limited to cooking and sewing. Women participated in demonstrations, field days, short courses, fairs, publications, and radio talks aimed specifically at them.

By 1945, the Agricultural Services Board Act was in place to set up boards in municipalities to handle local agricultural problems. Two- and three-day short courses were still well-attended, but not as much as agricultural meetings held in the late afternoon or evening. Demonstrations and field days were definitely the most popular forms of extension. Rural electrification was expanding and agriculturists had to give information on efficient use of electricity in lowering farm costs. Publications such as the weekly "Agricultural Notes" and "Agricultural Information" (published 13 times in 1945), as well as increased radio programs, were utilized to spread information to farmers. During 1947-48, long-term farm plans or farm management plans were starting to be discussed and developed. These were to be used by the farmer to "plan his production over a period of years in harmony with the principles of conservation farming and to coordinate this production with long-term market requirements (Alberta Department of Agriculture, 1950, p. 88). The Alberta Department of Agriculture's Annual Report of 1948 states:

> During the last few years there have been slow but certain changes taking place. In its earlier days, extension workers dealt with immediate problems such as weed control, live stock feeding and management, soil drifting, and so

> on. Although work of this kind will always be necessary, there is a growing trend by extension workers and farmers themselves to evade these problems by adopting a system of farming in which they are less likely to arise. (p. 82)

Issues such as soil conservation, weed control, crop and livestock improvements, and pests and diseases, were also very important to farmers at this time. By 1950, there were radio programs on three times per week, and 200,000 leaflets, bulletins, and circulars had been distributed to farmers. By 1960, farm management plans had come to include farm records and accounting, budgeting, market and price outlook, and farm credit.

The year 1960 saw the beginning of using television to disseminate information, but phone calls, letter writing, and farm visits were still the most important means of correspondence with farmers.

In 1965, training on methods and principles was starting to be offered to people working in extension. These ranged from 1-day courses to a full year of graduate level study. Extension staff were beginning to get involved in community development, instead of focusing on individual farmers. Commercials and 30-minute programs on television were being produced. The agriculturists still held demonstrations, field days, and short courses.

The Farm Management Branch was established in 1969, "to develop the management resource of farm operators. Farmers [were] provided efficient tools for decision making purposes, including accurate and adequate agricultural information, advanced economics and management principles, and a sound analysis procedure" (Alberta Department of Agriculture, 1969, p. 6).

In 1970, the Information Branch was responsible for producing and distributing information through radio, television, the press, and publications. A logo for the department was designed, and a product promotion officer was hired. A decline in the demand for short courses was offset by an increase in the demand for information and services on an individual basis. Advisory committees were becoming a popular means of pinpointing areas of agriculture that different communities in Alberta should focus on. Agriculture Week was initiated in 1972 to introduce "public awareness of the importance to Albertans of agriculture in general and farm families in particular" (Department of Alberta Agriculture, 1972, p. 17).

The 1974 Department of Alberta Agriculture Annual Report stated that "all programs and services carried out by [extension] staff were aimed at the broad objective of *improving the economic and social well-being* of rural residents and their communities" (p. 18; author's emphasis).

In the late 1970s, exchange programs with Japan, Korea, and Australia became new ways for Department staff to experience and learn different agricultural practices that could be applied in Alberta.

The Green Certificate program was started in 1975 "for the purpose of providing on-farm training experience and institutional education to persons wishing to become farmers in their

own right" (Department of Alberta Agriculture, 1975, p. 18). The program "utilizes a great deal of input from the farming public with groups of producers gathered to identify the basic skills of their industry. This competency documentation, which includes the establishment of training objectives, has been accomplished in beef, dairy, and crop production, as well as for farm machinery and farm management" (Department of Alberta Agriculture, 1976, p. 12).

Home study courses were also started in 1976 to allow people to study at home on their own time to become more knowledgeable about specific topics in agriculture.

In the mid-to-late 1980s, computer programs were beginning to be used to process payments, order products, and store information, such as recording milk production. In 1985/86 a joint program between IBM Canada, the University of Alberta, and Alberta Agriculture provided a basic understanding of computers and their use on the farm through the "Computers on Wheels" program. By 1989, computers were installed in all district offices to ensure field staff were able to make full use of the technology in serving their clients. In 1995 Alberta Agriculture established a pilot project website, which focused on providing timely production and marketing information to Alberta barley producers. Based on a positive evaluation of the project from 75 farmers and agribusinesses, a website was set up with a focus on beef, forage, and cereal information. It enabled farmers to communicate with their district field men by e-mail, had a seeding rate calculator, and held a database of crop varietal test data to allow farmers to make informed cropping choices.

About the same time that the Department of Alberta Agriculture changed its name to the present-day "Alberta Agriculture, Food and Rural Development," the annual reports took on a significant change in format. No longer narrative reports, they became financial statements of the previous year, with very little descriptive summaries of the work that was being done within the department. When the "Extension Division" of Alberta Agriculture was eliminated in 1984, and amalgamated with the "Engineering and Rural Services Division" (Baker, 1987), it was the first sign that extension was becoming less of a priority for the department. While the people performing extension work continue to exist as is the case today, their role became incorporated into other aspects of agricultural work, so that in essence, everyone who works for the department became a bit of an extensionist.

Appendix 2. Questionnaire for Farm Household Survey.

Barriers and Motivators to Adoption of
Conservation and Food Safety Best Practices

The Alberta Research Council, a not-for-profit research and development corporation wholly owned by the Government of Alberta, is conducting this survey at the request of:

- the Alberta Environmental Farm Plan (AEFP),
- Agriculture and Agri-Food Canada (AAFC) – Prairie Farm Rehabilitation Administration (PFRA),
- Alberta Agriculture Food and Rural Development (AAFRD) – Alberta Environmentally Sustainable Agriculture (AESA), and
- Rural Business and Diversification Branch and Food Safety Division.

The purpose of this survey is to gain a better understanding of the goals and needs of farmers in Alberta, and to understand those factors that encourage or discourage farmers from adopting conservation and food safety best practices. We are particularly interested in learning about key social factors that are either motivating or hindering the adoption of such practices, but other factors (economic, environmental, etc.) may also be important. This survey is being conducted during March-May 2006 in selected locations of the province of Alberta with producers and farm direct marketers on a randomly selected household basis. The information gained from this survey will be used as an important resource for the continued development, improvement and/or delivery of agricultural extension services in the province.

We would greatly appreciate it if you could take the time to complete this survey. Please answer all of the questions to the best of your knowledge. If there is a question you wish not to answer, please feel free to leave it blank and continue to the next question.

Your responses and your identity will be kept anonymous and confidential.

If you have any questions regarding this survey or the project in general, please contact:

Marke Ambard, Project Coordinator, Alberta Research Council, Edmonton
Ph. (780) 499-7837; E-mail: marke.ambard@arc.ab.ca
or
Ross Mitchell, Project Manager, Alberta Research Council, Edmonton
Ph. (780) 450-5260; E-mail: ross.mitchell@arc.ab.ca

If you know of any neighbour or other agricultural producer that you think may wish to complete this survey, please have them fill it out and mail it directly to:

Marke Ambard, Sustainable Ecosystems
Alberta Research Council
250 Karl Clark Road
Edmonton, Alberta
Canada T6N 1E4

A. Your Farming Situation

A better understanding of your farming situation will help us to determine relevant barriers and motivators you may face in terms of adopting conservation and food safety best practices.

1. What kind of farm do you operate?
_____

2. Would you classify your farm as small, medium or large for your area (*i.e. county*)?
_____

3. How long have you been farming? _____ years

4. How did you get into farming? _____

5a. Do you anticipate that a **family member** (*e.g., husband, wife, daughter, son, niece, nephew, etc.*) will take over the farm after your retirement? (*Please check* (✔) *the most appropriate answer)*

☐ Yes ☐ No ☐ Unsure

5b. Why or why not? _____

6. How much land do you farm? _____

7a. Do you farm land that you do not own? (i.e., are you renting or leasing from someone else?)

☐ Yes IF YES, GO TO QUESTION 7b.
☐ No IF NO, GO TO QUESTION 8a.

7b. How much land do you rent or lease from someone else? _____

8a. Do you own land that you do not farm, but instead rent or lease out to another producer?

☐ Yes IF YES, GO TO QUESTION 8b.
☐ No IF NO, GO TO QUESTION 9

8b. How much land do you rent out? _____

9. How many years do you have before your likely retirement age? _____ years.

10a. Do you practice farm direct marketing? (i.e., do you own a U-Pick, or sell food for consumption off your farm, or at a farmers market?)

☐ Yes ☐ No

10b. Why or why not? _____

B. Humans and Nature

11. Please indicate your level of agreement or disagreement with the following statements about humans and our relationship to nature (*from **1** – strongly agree to **5** – strongly disagree; show respondent this table and have them circle their choice for each*).

	Strongly Agree				Strongly Disagree
a. Humans are separate from and superior to nature.	1	2	3	4	5
b. The balance of nature is very delicate and easily upset.	1	2	3	4	5
c. Nature exists primarily for humans to use.	1	2	3	4	5
d. People just need to accept that growing food takes a certain toll on the environment.	1	2	3	4	5
e. All plants and animals have value and need protection for their own sake.	1	2	3	4	5
f. Humans will eventually learn enough about how nature works to be able to control it.	1	2	3	4	5
g. Humans are severely abusing the environment.	1	2	3	4	5
h. Humans were meant to rule over the rest of nature.	1	2	3	4	5
i. Humans are a part of and subject to nature.	1	2	3	4	5
j. Technology will allow agriculture to remain a viable way of life.	1	2	3	4	5
k. Nature possesses its own value, independent of human use.	1	2	3	4	5
l. Current agricultural practices do not harm nature.	1	2	3	4	5
m. Human ingenuity will allow agriculture to remain a viable way of life.	1	2	3	4	5
n. All plants and animals are equally valuable and must be given equal respect and protection.	1	2	3	4	5
o. The government is responsible for ensuring the responsible use of our environment.	1	2	3	4	5

C. Networks

This section will help us understand the social networks that are of importance to you, as well as those who play a role in how you farm.

12. What is the common meeting place in your community where people can go to chat with their neighbours and fellow producers? (*e.g., coffee shop, church, curling rink, etc.*)

_____

13a. How often do you go to this meeting place? (*Please check* (✓) *only one answer)*

____ Every day
____ Once a week
____ Once every couple of weeks
____ Once a month
____ Twice a year
____ Rarely
____ Other (*please specify)* _____

____ Never IF NEVER, GO TO QUESTION 14a.

13b. Would you say you are more a talker or a listener at this meeting place?

_____

14a. Please list the organizations (e.g., church, producer groups, recreation groups, etc.) that you are a member of in the space below, and estimate how many times per year you meet with each group.

_____ _____ times per year
_____ _____ times per year
_____ _____ times per year
_____ _____ times per year

14b. Please circle the above the organization that you feel the most involved with.

15. Do members of your family contribute to farm management decisions?

(Please check (✓) the appropriate answer)

☐ Yes GO TO QUESTION 16a.
☐ No GO TO QUESTION 17

16a. Who in your family contributes to farm management decisions? *(e.g., wife, husband, mother, father, sister, etc.)* (Multiple answers are accepted)

_____ _____ _____ _____
_____ _____ _____ _____

16b. Please circle the above family member who has the most influence on farm management decisions.

17. Do you have a farm management team that contributes to your farm management decisions? (e.g., boss, landowner, lawyer, accountant, board members, etc.) (Please check (✓) the appropriate answer)

☐ Yes GO TO QUESTION 18a.
☐ No GO TO QUESTION 19

18a. Who on your farm management team contributes to important farm decisions? (We are **not** asking for names, only job roles, e.g., boss, landowner, lawyer, accountant, board members, etc.) (Multiple answers are accepted)

_____ _____ _____ _____
_____ _____ _____ _____

18b. Please circle the **three** farm management team members who have the **most** influence on your farm management decisions.

19. Those who contribute to your farm management decisions have _____ interest in conservation practices than you: (*Please check* (✓) *the most appropriate answer to fill in the blank)*

☐ more
☐ less
☐ the same
☐ some of them have more/some have less
☐ Don't Know
☐ Not Applicable (i.e., no one else contributes to your decisions regarding farm management)

(IF YOU CHECKED NOT APPLICABLE, GO TO QUESTION 21)

20. Those who contribute to your farm management decisions have _____ you to adopt conservation practices: (*Please check* (✓) *the most appropriate answer)*

☐ encouraged
☐ discouraged
☐ sometimes encouraged/ sometimes discouraged
☐ neither encouraged nor discouraged
☐ Not Applicable

21. In your opinion, what are the signs of a "good farmer"?
(Multiple answers are acceptable)

_____
_____
_____
_____

22. Who (or what) has been the greatest influence on the way you farm?

_____
_____

23. Could you list some other important influences on the way you farm?

_____
_____
_____

24a. Are producers who adopt conservation practices generally well-respected in your community? (*Please check* (✓) *the appropriate answer)*

☐ Yes ☐ No ☐ Unsure ☐ Some Yes/ Some No ☐ Most Yes/ A Few No ☐ A Few Yes/ Most No

24b. Why or why not?

_____
_____

D. Farming and Conservation

The following questions are to get your opinion on the state of farming and the usefulness of conservation and food safety best practices.

25. What do you see as the biggest future challenges that your farm will face:
a. in the short-term (1 – 5 years)? _____
b. in the long-term (over 6 years from now)? _____

26. Do you think adopting conservation practices will help your farm: (*Please check* (✓) *the appropriate answers)*
a. in the short-term (1 – 5 years)? ☐ Yes ☐ No
Why or why not? _____

b. in the long-term (over 6 years from now)? ☐ Yes ☐ No
Why or why not? _____

27. Do you think adopting food safety best practices will help your farm: (*Please check* (✓) *the appropriate answers)*
a. in the short-term (1 – 5 years)? ☐ Yes ☐ No
Why or why not? _____

b. in the long-term (over 6 years from now)? Yes ☐ No ☐
Why or why not? _____

28a. Are there any agricultural practices that cause you concern for the health of the land, the water or your family?
☐ Yes IF YES, GO TO QUESTION 28b.

☐ No IF NO, GO TO QUESTION 29a.

28b. Which agricultural practices cause you concern for the land, water, or your family?

_____

28c. Does the above practice concern you more in terms of the land, the water or your family?

_____

29a. In the past 3 years, have you taken steps to reduce the impact of your agricultural practices on the health of the land, water or your family? (*Please check* (✓) *the appropriate answer)*

☐ Yes ☐ No

29b. Why or why not? _____

IF YOU ANSWERED YES, GO TO QUESTION 30
IF YOU ANSWERED NO, GO TO QUESTION 31

30a. What are some of the steps you have taken in the last 3 years to reduce the impact of your agricultural practices on the health of the land, water or your family?

_____
_____
_____

30b. Did you take the above steps for more the health of the land, the water, or your family? _____

31a. Are there any conservation practices you have heard of in the last 3 years that you have not adopted?

☐ Yes **IF YES, GO TO QUESTION 31b.**

☐ No **IF NO, GO TO QUESTION 32**

31b. Which ones in particular? _____

_____

32. Please indicate (*by checking* (✓) *Yes or No*) whether the following statements adequately explain why you **did not** (or **might not**) adopt conservation practices. *(When done, please **rank the Top 3 reasons** you **did not** (or **would not**) adopt certain conservation practices)*

	Yes	No	TOP THREE (3) barriers to adoption
a. Lack of technical information/knowledge			
b. Family not supportive of adopting conservation improvements			
c. The effectiveness of proposed conservation practices is uncertain			
d. Conservation practices are too complex			
e. Lack of personal incentives (e.g., no benefits in adopting such improvements)			
f. Unfavourable market conditions			
g. Adopting environmental improvements is not a priority			
h. Level of debt			
i. Proposed conservation practices are not well-respected by other farmers			
j. Inadequate revenues			
k. The agencies or people providing information on conservation practices are not trustworthy			
l. Proposed conservation practices are not suitable to farm situation			
m. Lack of financial incentives (e.g., government subsidies)			
n. Other (*please specify*)			

33. Aside from financial incentives, what would encourage you to adopt other conservation practices?

_____

_____

_____

34a. Are you more likely to adopt conservation practices on land that you own rather than rent?

☐ Yes ☐ No ☐ Depends ☐ Not Applicable

34b. Why or why not?

_____

_____

35. What is most important to you about being a farmer?

_____
_____
_____
_____

E. Information Sources

The following questions will help us understand what information sources and channels you find the most useful and trustworthy.

36. Where do you typically find trustworthy information about new farming and food safety practices or innovations? (*Please check* (✓) *all the answers that apply to your situation.)*

☐ Call centres ☐ Internet ☐ Professionals and/or specialists

☐ Magazines ☐ Radio ☐ Television

☐ Neighbours ☐ Relatives ☐ Workshops, field days and/or tours

☐ Coffee shop, church, and/or curling clubs

☐ Producer groups, clubs, and/or associations

☐ Other (*Please specify*) _____

☐ Other (*Please specify*) _____

37. In your opinion, what are the **three** most trustworthy sources of information available for learning of new farming and food safety practices or innovations?

1. _____
2. _____
3. _____

38a. Do you like experimenting with your farming practices to see how your land and/or yields will react? (*Please check* (✓) *the most appropriate answer)*

☐ Yes ☐ No

38b. Why or why not?

_____
_____

39. What can information sources do to make conservation information more useful for you?

_____
_____
_____

40a. Does the conservation information being promoted in your community seem relevant to your farm or farming situation? (*Please check* (✓) *the appropriate answer)*

☐ Yes IF YES, GO TO QUESTION 41a.
☐ No IF NO, GO TO QUESTION 40b.

40b. Why do you feel the information is NOT relevant to your farm or farming situation?

_____
_____

41a. Do you believe the government should be promoting conservation practices for farming? (*Please check* (✓) *the appropriate answer)*

☐ Yes ☐ No

41b. Why or why not?

_____
_____

F. Demographic Information

This section will be used to determine if there are personal characteristics that increase one's likelihood of adopting conservation and/or food safety practices. All personal information is confidential. However, if you do not wish to answer a question, just leave it blank and move to the next question.

42. Gender: ☐ Female ☐ Male

43. Age:

☐ <25 ☐ 26 – 35 ☐ 36-45 ☐ 46-55 ☐ 56-65 ☐ 66+

44. Education:

	Check highest level achieved
Less than high school diploma	
High school diploma or equivalent	
Some college or university	
College diploma or certificate	
University degree	
Master's degree	
Ph.D.	

What was your area of specialization in your highest level achieved?

_____

45. How many days per year (on average) do you spend attending workshops, conferences, training sessions, field days, etc.

_____ days

46. Occupation: Indicate which of the following applies to you. (*Please check* (✓) *all that apply)*

- ☐ Farmer
- ☐ Rancher
- ☐ Agricultural industry representative
- ☐ Non-agricultural industry representative (e.g., petroleum, forestry, etc.)
- ☐ Non-profit agency representative
- ☐ Government official (if so, please indicate which level):
  - ☐ municipal ☐ provincial ☐ federal
- ☐ Other *(Please specify)*: _____

47. In 2005, what was your Annual Gross Farm Income? (*Please check* (✓) *the most appropriate answer)*

☐ < $10,000 ☐ $10,000 – 49, 999 ☐ $50,000 – 99,999 ☐ $100,000 – 249,999

☐ $250,000 – 499,999 ☐ $500,000 – 999,999 ☐ >$1,000,000

Farm Direct Marketing Survey

Please complete this survey **only** if applicable.
(i.e., You answered **YES** to **Question 10a**. "Do you practice farm direct marketing?")

1. Which of the following areas of the food manufacturing process are you involved in? (*Please check* (✓) *all appropriate answers)*

☐ Production ☐ Processing ☐ Marketing

2. What are some of the steps you have taken in the last 3 years to make the food products you farm direct market safe?

_____
_____
_____

3a. In the table below, please indicate whether you were **aware** of the universal steps that need to be taken ensure safe handling of food for each of the listed categories.

Food safety practices for:	Were you aware of these food safety practices? (Y or N)
Premises	
Transportation & Storage	
Equipment	
Personnel	
Sanitation & Pest control	
Recall	

IF YOU ANSWERED NO TO ALL OF THE ABOVE CATEGORIES, GO TO QUESTION 4

IF YOU ANSWERED YES TO ANY OF THE ABOVE CATEGORIES, GO TO QUESTION 3b.

3b. For the best practices that you were aware of, please indicate **whether you have adopted the practices or not**, and in a few words **explain why or why not**. For the practices you were not aware of, you can leave the space blank and proceed to the next question.

Food safety practices	Have you adopted these best practices? (Y or N)	Why or Why Not?
Premises		
Transportation & Storage		
Equipment		
Personnel		
Sanitation & Pest control		
Recall		

4. Will you adopt food safety practices for each level of the food manufacturing process that you are involved with (*i.e., the production, processing, and/or marketing level*)?

☐ Yes ☐ No ☐ Unsure ☐ Have already adopted them

4b. Why or why not? _____

5. What would allow (or convince) you to adopt food safety practices in your farm direct business, at each level of the food manufacturing process (*i.e., production, processing, and/or marketing level*)?

_____
_____
_____

6. What is preventing you from adopting food safety best practices?

_____
_____
_____

7. What benefits do food safety best practices offer your business?

_____
_____
_____
_____

8. What benefits do you see in selling directly to the consumer?

_____
_____
_____

9. What societal or consumer trends influence your farming practices?

_____
_____
_____

Appendix 3. Interview Guide for Focus Group #1.

St. Paul Focus Group Questions: Adoption of Conservation and Food Safety Best Practices in Alberta

Location: Super 8 Motel, 5008-43rd Street, St. Paul
Date: April 26, 2006
Time: Start at 6:00 pm, dinner at 6:15 pm, focus group from 7-9:30 pm
Facilitation: Donna Bagdan will facilitate. Marke Ambard or Ross Mitchell (TBC) will be the technical rep.

This focus group session will serve as a forum for Alberta Research Council and its clients to discuss several project questions in detail. Focus group questions have been categorised into three related themes: 1) information sources, 2) barriers and motivators to Conservation and Food Safety BMPs, and 3) other social perspectives on farming. (Note to facilitators: it's inevitable that skipping around will occur. That's OK, as long as the questions get addressed.)

1. Information Sources
   - Where do farm direct marketers and producers get their information they use to make management decisions?
   - How would you rate (or value, regard) the information you receive? (e.g. excellent, good, average, fair, poor? Why or why not?)
   - What can extension practitioners do to make Food Safety and Conservation information more useful? (more relevant, timely, dependable, comprehensible, cost-effective, etc.)

2. Barriers and Motivators to Conservation and Food Safety BMPs
   - What are some examples of beneficial management practices (BMPs) that promote Conservation and Food Safety?
   - What prevents you from adopting Conservation and Food Safety BMPs at each level of your production system?
   - NOTE: IF they focus on money/economics/funding, then ask them "Apart from financial constraints, what else might prevent you from adopting Conservation and Food Safety BMPs?"
   - What would motivate you to adopt Conservation and Food Safety BMPs at each level of your production system?
   - NOTE: IF they focus on money/economics/funding, then ask them "Apart from financial constraints, what else might motivate you from adopting Conservation and Food Safety BMPs?"

3. Other Social Perspectives on Farming
   - Do family and consumer health affect your farm management decisions? If so, how? (or, alternatively, why not?)

- Does a concern for the environment (land, water, air) affect your farm management decisions? If so, how? (or alternatively, why not?)
- What societal or consumer trends influence your farming and Food Safety BMPs? (either negatively or positively)
- What do you think needs to change in order for agriculture to remain a viable way of life?

Wrap-up

- Is there anything else anyone would like to add?
- Thank them for coming.
- Have them fill out a short questionnaire before leaving, including their name and contact information to be able to send them a summary of the final report.
- Please give each participant a copy of the survey and ask him/her to fill it out and send it back to us if they like.
- Voucher distribution.

Appendix 4. Interview Guide for Focus Group #2

Focus Group Questions:
Adoption of Conservation and Food Safety Best Practices in Alberta

This focus group session will serve as a forum for Alberta Research Council and its clients to discuss several project questions in detail. Focus group questions have been categorised into three related themes: 1) information sources, 2) Conservation and Food Safety BMPs, and 3) farm direct marketing. (Note to facilitators: it's inevitable that skipping around will occur. That's OK, as long as the questions get addressed.)

1. Information Sources
   - Where do farm direct marketers and producers get their information?
   - What can those offering conservation information (extension practitioners) do to make it more useful? (more relevant, timely, dependable, comprehensible, cost-effective, etc.)

2. Conservation and Food Safety BMPs
   - What are some examples of good conservation and food safety BMPs? Please explain.
   - What are some examples of bad conservation and food safety BMPs? Please explain. (This information could be very useful to get a feel for their general take on what the government is doing … it is important that we don't try to defend any criticized practices, but that we simply take their input and analyze it later).
   - Are there any agricultural practices that cause you concern for the health of the land, the water or your family?
   - Have you made any changes to your farming practices, or food safety BMPs in the last few years? If so, why? What inspired you to do that? Are you content with your decision?
   - How do you feel about those people or groups that offer conservation information to farmers? (i.e., *Is the conservation information useful? Are the people or groups trustworthy?*)

3. Farm Direct Marketing
   - What benefits do you see in selling directly to the consumer?
   - What benefits do Conservation and Food Safety BMPs offer your business?
   - What prevents you from adopting Conservation and Food Safety BMPs at each level of the food manufacturing process (i.e., production, processing, and/or marketing level)?
   - What would motivate you to adopt Conservation and Food Safety BMPs at each level of the food manufacturing process (i.e., production, processing, and/or marketing level)??

Wrap-up

- Is there anything else anyone would like to add?
- Thank them for coming.
- Have them fill out a short questionnaire before leaving, including their name and contact information to be able to send them a summary of the final report.
- Please give each participant a copy of the survey and ask him/her to fill it out and send it back to us if they like.
- Voucher distribution.

Appendix 5. Interview Guide for Key Informant Interviews.

A. Agricultural Extension in Alberta

1. Are you doing agricultural extension, and if so, what kind of extension would you say it is? Who are the beneficiaries of your agricultural extension?

2. What does agricultural extension mean to you?

3. What factors (technological, economic, political, climatic, etc.) influence the way agricultural extension is practised here?

4. What are some of the strengths and weaknesses of agricultural extension as it is now practiced here? For example, how is extension helping (or is not helping) to enhance Conservation and Food Safety BMPs?

5. What are your general feelings regarding the success of extension in terms of encouraging producers to adopt Conservation and Food Safety BMPs?

6. In your experience, what tools (or methods, approaches, techniques) work the best to assist extension practitioners in encouraging the adoption of Conservation and Food Safety BMPs?

7. In your experience, how should producers be involved (interact, participate) with agricultural extension and, more specifically, with extensionists?

8. Are there any policy or program issues that could assist extension practitioners and producers? If so, what are they?

9. What is the future of agricultural extension in Alberta? (depending upon response, ask "What *should* it be?")

B. Motivators and Barriers

1. What are some key influences that you think encourage producers to adopt Conservation and Food Safety BMPs?

2. What are some key barriers (or obstacles) that you think discourage producers from adopting Conservation and Food Safety BMPs?

3. Would you say the information that farmers are currently receiving about Conservation and Food Safety BMPs is practical, easy to trial and better for their operation than what they were doing before? Are they receiving enough information? Is the information going to the right people?

4. What are you or your organization currently doing to increase adoption of Conservation and Food Safety BMPs?

5. In your experience, what are other organizations doing to encourage adoption of Conservation and Food Safety BMPs?

6. In your opinion, what else could be done to better deal with these issues of Conservation and Food Safety BMPs? (i.e. what is missing?)

Appendix 6. Project Communication Plan

Rural Sociological Barriers to Adoption
Communication Plan
March 2006

Purpose
Create readable and engaging communication pieces about our research project.

We want our information to have impact. To do this we need to engage our target audience in the current knowledge as well as the new information we are learning. Thus we need to translate the current information to the language of our target audience.

Target Audience
Extension staff in the agricultural-environmental field.

Key Contact for this Aspect
Therese Tompkins
780-499-087 or 1-866-844-2337 or Tompkins@albertaEFP.com

Contractor
Rebecca Dibbelt
780-624-5422 or write@cablerocket.com

Distribution
Email
Website postings
Other (based on recommendations)
Who will distribute? Likely -research team members

Possible avenues for communication:
1. Farming for Tomorrow
    a. Fall edition
2. Green Matters – AESA via Roger
3. Communications Connections – e-newsletter – via Ken and Karen
4. Call of the Land – via Ken and Karen
5. Agri-News – via Ken and Karen

Remember to share press releases with all those names on the letter that are committed to the partnership.

Timeline
March 15 to July 15, 2006 with the possibility of extension:
- October 2006 to capture workshop

Cash Budget
Total: $2500.00 Source: The Alberta Environmental Farm Plan Company

To be split for writing, design (if needed) and media buy (if needed).

In-kind contributions will be coming from all the partners – through their contribution of ideas, review of articles or posting information / link on website/email system.

Some Key Timelines

March 15, 2006	Phase 1 complete
March to May	In-field research and focus groups
May/June 2006	Report writing
July 2006	Final report due
October 2006	Presentation to target audience

Deliverables (ideas)

2 News releases
Introducing the project
Reporting the final report
4-6 articles – there will be a short and long version for each article
One article about each aspect of the literature review – sharing (translating) what we are learning:
Factors affecting the adoption of conservation and food safety best practices – what the research says (several articles?)
Agriculture extension
History of extension in Alberta
The survey
Results from the survey and focus groups
Results from the workshop
Results from the final report
Web article – one page on one of our websites that describes the project and provides links to more information.
At this time we will wait for developing a website
Advertisement/Article that will promote our workshop profiling this project/research
Other?

Information Resources
Past communication pieces
Team members
Researchers
Literature review
Final report
Other?

Special Consideration

All communication pieces need to be approved by the partners:
Alberta Research Council
Alberta Agriculture, Food and Rural Development
Agriculture and Agri-Food Canada
The Alberta Environmental Farm Plan Company

For exact contact, refer to partnership letters.

As a parallel process, all news releases and articles must be approved by our (AEFP) partners: AAFRD and AAFC. These are the partners involved in APF. Joint approvals will ensure complete partner awareness prior to public release.

Mike Slomp will coordinate approvals among partners – draft news releases should be forwarded to Mike one (1) week before release date.

Established protocol with news releases: If one partner is quoted in a news release, all need to be quoted. Thus it is all or none.

Acronyms and Glossary

AAFC	Agriculture and Agri-Food Canada
AAFRD	Alberta Agriculture, Food and Rural Development
AEFP	The Alberta Environmental Farm Plan Company
APF	Agricultural Policy Framework
ARC	Alberta Research Council

Extension staff - People dedicated to bringing educational programs and research based information to farmers and ranchers in Alberta. The audience is typically adults, aged 21 to 70.

Extension sometimes called outreach or continuing education.

Other Ideas

Need pictures:
Rural social photos – group meeting, etc.

Appendix 7. Project News Release.

Survey to ask: What's Driving Alberta's Farming Methods?

VEGREVILLE, ALBERTA (April 28, 2006) – What factors make people choose to act, or not act, in a certain way? Knowing the answer to this question provides valuable information. That is why the Alberta Research Council (ARC) is visiting Alberta communities this spring. Their goal: to investigate the key motivators and barriers – social needs – of farmers and landowners that help or hinder them in adopting conservation and food safety best practices.

The first phase of the project is a farm household survey targeted to five municipalities: Forty Mile, Fairview, Ponoka, and Special Areas No. 2 and Acadia. Researchers aim to collect about 100 surveys by the end of May.

Marke Ambard, the scientist conducting the surveys, says anyone can take part, even if they are outside of the five targeted municipalities. "Although we will randomly contact households to participate in the survey, we are looking to collect information from as many producers as possible," he says. "If anyone wants to take part, all they need to do is contact our office and we will send out a survey. "

Ross Mitchell, the environmental sociologist leading the study for ARC, says he is pleased with the high quality of feedback already being received.

"We are examining issues peculiar to rural challenges that take into account natural resources and the environment, food systems, and social behaviours," explains Mitchell. "New and relevant agricultural policy and programs that lead to better agricultural sustainability of rural regions and their people can then be shaped and developed based on this research."

This project builds upon ARC's previous research experience, gained through working with Alberta Agriculture and other clients to develop environmentally sound practices pertaining to Alberta's rural landscapes, industries and communities.

Project results will help ARC's client develop and deliver improved extension programs to Alberta's farming community. In this case, the client is a partnership. Members include: Agriculture and Agri-Food Canada – Prairie Farm Rehabilitation Administration, Alberta Agriculture Food and Rural Development, and the Alberta Environmental Farm Plan Company.

"This is ground-breaking research," says Ambard. "Most research has looked at the economics of rural Alberta, but very little has been done on the social aspects. People make decisions for more reasons than money, and knowing those reasons will help rural Alberta grow and develop."

Once the surveys are completed, ARC will progress to the second phase of the study, which involves conducting focus groups with producers. The final phase will be a series of

interviews with industry experts. ARC expects the project to wrap up at the end of July, 2006.

Anyone interested in taking the survey is asked to contact ARC project coordinator Jennifer Karpyshyn, by e-mailing Jennifer.Karpyshyn@arc.ab.ca or calling (780) 450-5355.

The Alberta Research Council (ARC) delivers innovative science and technology solutions to meet the priorities of industry and government in Alberta and beyond. Integrated multi-disciplinary teams help customers and partners take technologies from the laboratory to the field, strengthening their competitiveness and sustainability. ARC accelerates the development of products, processes and services in the energy, life sciences, agriculture, environment, forestry and manufacturing sectors.

Jodi Tauber
Communications Specialist
Alberta Research Council
(780) 450-5062
www.arc.ab.ca

Appendix 8. Quantitative Farm Household Survey Tables.

A. Your Farming Situation

Table 1. Survey respondents by county of residence.

	#	%
40-Mile	24	37.6
Special Areas	23	35.9
Ponoka	8	12.5
Fairview	7	10.9
St. Paul	2	3.1
Total	64	100.0

Table 2. Survey respondents by type of farm operation. (Q.A1)

	#	%
Mixed	31	48.4
Livestock	17	26.6
Crop	16	25.0
Total	64	100.0

Table 3. Survey respondents by size of farm operation. (Q.A2)

	#	%	Acres (Average)
Small	21	32.8	1,769
Medium	34	53.1	4,465
Large	9	14.1	14,310
Total	64	100.0	

Table 4. Do you anticipate that a family member will take over the farm after your retirement? (Q.A5)

	#	%
Yes	25	39.1
No	22	34.4
Maybe	17	26.5
Total	64	100.0

Table 5. Do you farm land that you do not own? (Q.A7)

	#	%
Yes	39	60.9
No	25	39.1
Total	64	100.0

Average # of acres that you farm that you do not own = 2,695.

Table 6. Do you own land that you do not farm, but instead rent or lease out to another producer? (Q.A8)

	#	%
Yes	7	11.1
No	56	88.9
Total	63	100.0

Average # acres that are rented out = 691

Table 7. Do you practice farm direct marketing? (Q.A10)

	#	%
Yes	13	20.3
No	51	79.7
Total	63	100.0

B. Humans and Nature

Table 8. Number of survey respondents who strongly agree (SA), agree (A), are neutral or unsure (N/U), disagree (D) or strongly disagree (SD) with the following statements. (Q.B11)

	SA	%	A	%	N/U	%	D	%	SD	%	Total	%
Humans are separate from and superior to nature	15	23.4	3	4.7	16	25.0	11	17.2	19	29.7	64	100.0
The balance of nature is very delicate and easily upset	29	45.3	19	29.6	11	17.2	1	1.6	4	6.3	64	100.0
Nature exists primarily for humans to use	6	9.4	7	10.9	16	25.0	17	26.6	18	28.1	64	100.0
People just need to accept that growing food takes a certain toll on the environment	10	15.6	12	18.8	15	23.4	12	18.8	15	23.4	64	100.0
All plants and animals have value and need protection for their own sake	26	42.6	20	32.8	11	18.1	1	1.6	3	4.9	61	100.0
Humans will eventually learn enough about how nature works to be able to control it	7	10.8	11	17.2	17	26.6	8	12.5	21	32.9	64	100.0
Humans are severely abusing the environment	9	14.1	18	28.1	19	29.6	9	14.1	9	14.1	64	100.0
Humans were meant to rule over the rest of nature	9	14.1	4	6.3	9	14.1	18	28.1	24	37.4	64	100.0
Humans are a part of and subject to nature	33	51.5	27	42.2	1	1.6	1	1.6	2	3.1	64	100.0
Technology will allow agriculture to remain a viable way of life	6	9.4	19	29.6	20	31.3	10	15.6	9	14.1	64	100.0
Nature possesses its own value, independent of human use	28	44.4	25	39.7	8	12.7	2	3.2	0	0.0	63	100.0
Current agricultural practices do not harm nature	5	7.8	8	12.5	26	40.7	15	23.4	10	15.6	64	100.0
Human ingenuity will allow agriculture to remain a viable way of life	10	15.9	24	38.1	21	33.3	3	4.8	5	7.9	63	100.0
All plants and animals are equally valuable and must be given equal respect and protection	18	30.1	17	28.3	9	15.0	11	18.3	5	8.3	60	100.0
The government is responsible for ensuring the responsible use of our environment	5	7.8	15	23.5	22	34.4	15	23.4	7	10.9	64	100.0

C. Networks

Table 9. What is the common meeting place in your community where people can go to chat with their neighbours and fellow producers? (The total will be greater than 100% because many people indicated more than one meeting place.) “Other” includes the bar, post office, telephone, grain elevator, garage. (n=64) (Q.C12)

	#	%
Coffee Shop	29	45.3
Curling Rink	14	21.9
Church	13	20.3
Community Hall	7	10.9
House	6	9.4
Auction Mart	5	7.8
School	4	6.3
Hardware/Grocery/Parts Store	3	4.7
Other	20	31.3

Table 10. How often do you go to this meeting place? “Other” includes as often as 2 or 3 times a week, seasonal (more often in spring/summer), or whenever information is needed. (Q.C13a)

	#	%
Once a month	15	23.4
Once a week	10	15.6
Rarely	8	12.5
Never	7	10.9
Every day	6	9.4
Once every couple of weeks	2	3.1
Twice a year	0	0.0
Other	16	25.0
Total	64	100.0

Table 11. Would you say you are more a talker or a listener at this meeting place? (Q.C13b)

	#	%
Listener	35	63.6
Talker	6	10.9
Both	14	25.5
Total	55	100.0

Table 12. Do members of your family contribute to farm management decisions? (Q.C15)

	#	%
Yes	58	90.6
No	6	9.4
Total	64	100.0

Table 13. Who in your family contributes to farm management decisions? “Other” includes brother-in-law and sister-in-law, grandfather, nephew. The total is greater than 100% because respondents could indicate more than one family member (n=64) (Q.C16a)

	#	%
Spouse	41	64.1
Children	17	26.6
Brother	15	23.4
Father	14	21.9
Mother	10	15.6
Self	4	6.3
Other	7	10.9

Table 13b. Who in your family has the most influence over your farm management decisions? (Q.C16b)

	#	%
Spouse	22	57.9
Son	2	5.3
Brother	4	10.5
Father	4	10.5
Mother	1	2.6
Parents	1	2.6
Self	2	5.3
Together	1	2.6
Depends	1	2.6
Total	38	100.0

Table 14. Do you have a farm management team that contributes to your farm management decisions? (Q.C17)

	#	%
Yes	14	21.9
No	50	78.1
Total	64	100.0

Table 15. Who on your farm management team contributes to important farm decisions? (The total is greater than 100% because respondents were permitted to indicate more than one person.) (n=14) (Q.C18a)

	#	%
Accountant/Banker/Financial Advisor	13	92.9
Feed nutritionist	1	7.1
Agrologist	1	7.1
Auditor	1	7.1
Farm Business Advisor	1	7.1
Government	1	7.1
Lawyer	1	7.1
Soils guy	1	7.1
Experienced neighbours	1	7.1
Farm surveyed for advice	1	7.1

Table 15b. Who on your farm management team has the most influence on your farm management decisions? (The total is greater than 100% because respondents were permitted to indicate more than one person.) (n=11) (Q.C18b)

	#	%
Accountant/Banker/Financial Advisor	9	81.8
Auditor	1	9.1
Farm Business Advisor	1	9.1
Farm surveyed for advice	1	9.1
Lawyer	1	9.1
Soils guy	1	9.1
Feed nutritionist	1	9.1
They have different kinds of influence	1	9.1

Table 16. Those who contribute to your farm management decisions have _____ interest in conservation practices than you: (Q.C19)

	#	%
The same	42	66.7
More	7	11.1
Less	7	11.1
Some have more/some have less	4	6.3
Not applicable	3	4.8
Don’t know	0	0.0
Total	63	100.0

Table 17. Those who contribute to your farm management decisions have _____ you to adopt conservation practices: (Q.C20)

	#	%
Neither encouraged nor discouraged	29	46.7
Encouraged	23	37.1
Sometimes encouraged/ sometimes discouraged	6	9.7
Not applicable	4	6.5
Discouraged	0	0.0
Total	62	100.0

Table 18. Are producers who adopt conservation practices generally well-respected in your community? (Q.C24)

	#	%
Yes	49	76.5
Some yes/ Some no	6	9.4
No	5	7.8
Unsure	3	4.7
Most yes/ A few no	1	1.6
A few yes/ Most no	0	0.0
Total	64	100.0

D. Farming and Conservation

Table 19. Do you think adopting conservation practices will help your farm: (Q.D26)

in the short-term (1 – 5 years)?

	#	%
Yes	46	73.0
No	17	27.0
Total	63	100.0

in the long-term (over 6 years from now)?

	#	%
Yes	49	80.3
No	12	19.7
Total	61	100.0

Table 20. Do you think adopting food safety best practices will help your farm: (Q.D27)

in the short-term (1 – 5 years)?

	#	%
Yes	31	48.4
No	33	51.6
Total	64	100.0

in the long-term (over 6 years from now)?

	#	%
Yes	29	48.3
No	31	51.7
Total	60	100.0

Table 21. Are there any agricultural practices that cause you concern for the health of the land, the water or your family? (Q.D28)

	#	%
Yes	43	69.4
No	19	30.6
Total	62	100.0

Table 22. In the past 3 years, have you taken steps to reduce the impact of your agricultural practices on the health of the land, water or your family? (Q.D29)

	#	%
Yes	52	81.3
No	12	18.7
Total	64	100.0

Table 23. Are there any conservation practices you have heard of that you have not adopted? (Q.D31a)

	#	%
Yes	27	46.6
No	31	53.4
Total	58	100.0

Table 24. Which conservation practices have you heard of that you have not adopted? The total is greater than 100% because respondents were permitted to indicate more than one practice. (n=26 because one person who answered yes to the previous question did not specify a practice.) (Q.D31b)

	#	%
Zero-till	10	38.5
Solar pumps on dugouts	4	15.4
Organic farming	4	15.4
Fencing dugouts	2	7.7
Green Manure Program	1	3.8
Piping in water	1	3.8
Changing corral system	1	3.8
Planting more trees	1	3.8
Continuous cropping	1	3.8
Other	5	19.2

Table 25. Please indicate whether the following statements adequately explain why you did not (or might not) adopt conservation practices. “Other” includes no time, labour shortages, small market for organics, lack of research. (Q.D32)

	Yes	%	No	%	Total	%
Lack of technical information/knowledge	15	23.8	48	76.2	63	100.0
Family not supportive of adopting conservation improvements	9	14.3	54	85.7	63	100.0
Effectiveness of proposed conservation practices is uncertain	33	51.6	31	48.4	64	100.0
Conservation practices are too complex	15	23.4	49	76.6	64	100.0
Lack of personal incentives (e.g. no benefits in adopting such improvements)	20	31.3	44	68.7	64	100.0
Unfavourable market conditions	38	60.3	25	39.7	63	100.0
Unaware of conservation practices suitable for the farm	0	0.0	4	100.0	4	100.0
Adopting environmental improvements is not a priority	15	23.8	48	76.2	63	100.0
Level of debt	28	43.7	36	56.3	64	100.0
Proposed conservation practices are not well-respected by other farmers	3	4.7	61	95.3	64	100.0
Inadequate revenues	41	64.1	23	35.9	64	100.0
The agencies or people providing info on conservation practices are not trustworthy	14	22.2	49	77.8	63	100.0
Proposed conservation practices are not suitable to farm situation	34	54.8	28	45.2	62	100.0
Lack of financial incentives (e.g. government subsidies)	32	50.0	32	50.0	62	100.0
Other	13	20.3	51	79.7	64	100.0

Table 26. Are you more likely to adopt conservation practices on land that you own rather than rent? (Q.D34)

	#	%
No	24	37.5
Yes	20	31.3
Depends	3	4.7
Not applicable	17	26.6
Total	64	100.0

E. Information Sources

Table 27. Where do you typically find trustworthy information about new farming and food safety practices or innovations? “Other” includes books and pamphlets, and CARA (Chinook Applied Research Association). The total is greater than 100% because respondents could list more than one information source. (n=64) (Q.E36)

	#	%
Magazines	57	89.1
Neighbours	56	87.5
Professionals and/or specialists	48	75.0
Workshops, field days and/or tours	46	71.9
Producer groups, clubs, and/or associations	45	70.3
Radio	37	57.8
Internet	36	56.3
Television	35	54.7
Relatives	26	40.6
Coffee shop, church, and/or curling clubs	23	35.9
Call Centres	11	17.2
Other	4	6.3

Table 28. What is the most trustworthy source of information for learning of new farming and food safety practices or innovations? (Q.E37)

	#	%
Professionals and/or specialists	12	19.4
Workshops, field days and/or tours	12	19.4
Magazines	7	11.3
Producer groups, clubs, and/or associations	7	11.3
Internet	7	11.3
Neighbours	5	8.1
Radio	3	4.8
Television	2	3.2
Coffee Shop	2	3.2
Agricultural school field days	1	1.6
Call Centres	1	1.6
Chinook Applied Research Association	1	1.6
Government departments	1	1.6
Library	1	1.6
Total	62	100.0

Table 29. What is the second most trustworthy source of information for learning of new farming and food safety practices or innovations? (Q.E37)

	#	%
Professionals and/or specialists	11	20.8
Magazines	9	17.0
Workshops, field days and/or tours	9	17.0
Neighbours	7	13.2
Producer groups, clubs, and/or associations	7	13.2
Radio	3	5.7
Relatives	2	3.8
Call centres/ manufacturers	1	1.9
Coffee shop/ church	1	1.9
Experimental farm field days	1	1.9
Internet	1	1.9
Television	1	1.9
Total	53	100.0

Table 30. What is the third most trustworthy source of information for learning of new farming and food safety practices or innovations? (Q.E37)

	#	%
Magazines	8	24.2
Workshops, field days and/or tours	6	18.2
Producer groups, clubs, and/or associations	4	12.1
Neighbours	3	9.1
Professionals and/or specialists	3	9.1
Internet	3	9.1
CARA	2	6.1
Television	2	6.1
Neighbours/ Coffee shop	1	3.0
All the rest	1	3.0
Other	33	100.0

Table 31. Do you like experimenting with your farming practices to see how your land and/or yields will react? (Q.E38)

	#	%
Yes	44	69.8
No	19	30.2
Total	63	100.0

Table 31. Does the conservation information being promoted in your community seem relevant to your farm or farming situation? (Q.E40)

	#	%
Yes	47	81.0
No	7	12.1
Don’t know/ Unaware of what is being promoted	4	6.9
Total	58	100.0

Table 32. Do you believe the government should be promoting conservation practices for farming? (Q.E41)

	#	%
Yes	53	88.3
No	7	11.7
Total	60	100.0

F. Demographics

Table 33. Gender. (Q.F42)

	#	%
Male	50	78.1
Female	14	21.9
Total	64	100.0

Table 44. Age. (Q.F43)

	#	%
>25	0	0.0
26-35	9	14.1
36-45	21	32.8
46-55	14	21.8
56-65	12	18.8
66+	8	12.5
Total	64	100.0

Table 45. Highest level of education achieved of survey respondents. (Q.F44)

	#	%
Less than high school diploma	6	9.5
High school diploma or equivalent	19	30.2
Some college or university	18	28.5
College diploma or certificate	10	15.9
University degree	10	15.9
Masters degree	0	0.0
Ph. D.	0	0.0
Total	63	100.0

Average # days per year spent training = 6 (Q.F45)

Table 46. Occupation of survey respondents. The total is greater than 100% because respondents could indicate more than one occupation. "Other" includes (n=64) (Q.F46)

	#	%
Farmer	54	84.4
Rancher	27	42.2
Agricultural industry representative	0	0.0
Non-agricultural industry representative	0	0.0
Non-profit agency representative	0	0.0
Municipal government official	1	1.6
Provincial government official	2	3.1
Federal government official	0	0.0
Other	14	21.9

Table 47. Annual Gross Farm Income. (Q.F47)

	#	%
<$10,000	1	1.9
$10,000 - $49,999	8	15.1
$50,000 - $99,999	11	20.8
$100,000 - $249,999	12	22.6
$250,000 - $499,999	14	26.4
$500,000 - $999,999	5	9.4
>$1,000,000	2	3.8
Total	53	100.0

Table 48. Worldview classification of respondents.

	#	%
NEP	7	10.9
Middle NEP	10	15.6
Mixed	42	65.6
Middle DSP	3	4.7
DSP	2	3.1
Total	64	100.0

Table 49. Producer Type classification of respondents.

	#	%
Conventional	50	78.1
Alternative	8	12.5
Status	6	9.4
Total	64	100.0

Farm Direct Marketing

Table 50. Which of the following areas of the food manufacturing process are you involved in? (N=5) (Q.1)

	#	%
Production	5	100.0
Marketing	3	60.0
Processing	1	20.0

Table 51. Please indicate whether you were aware of the universal steps that need to be taken ensure safe handling of food for each of the listed categories. (Q.3a)

	#	%	n
Premises	5	100.0	5
Transportation and Storage	5	100.0	5
Equipment	5	100.0	5
Personnel	5	100.0	5
Sanitation	5	100.0	5
Recall	3	75.0	4

Table 52. For the best practices that you were aware of, please indicate whether you have adopted the practices or not. (n=3) (Q.3b)

	#	%
Premises	3	100.0
Transportation and Storage	2	67.0
Equipment	2	67.0
Personnel	2	67.0
Sanitation	3	100.0
Recall	2	67.0

Table 53. Will you adopt food safety practices for each level of the food manufacturing process that you are involved with? (Q.4)

	#	%
Yes	2	66.7
No	0	0.0
Unsure	0	0.0
Have already adopted them	1	33.3
Total	3	100.0

Appendix 9. Qualitative Farm Household Survey Tables.

Table 1. Do you anticipate that a family member will take over the farm after your retirement? Why or why not? (Q.A5)

Response	Yes	No	Maybe	Grand Total
2 daughters - one far, one husband in oil			1	1
2 daughters, none interested		1		1
2 girls - hope they don't		1		1
2 girls - wouldn't encourage anyway		1		1
2 sons - grain and cattle work	1			1
are right now	1			1
brothers kids or maybe mine if I have some	1			1
children too young and farming situation			1	1
daughter and husband setting up	1			1
daughters love animals (cows and horses)	1			1
economics		1	1	2
economy issue			1	1
family tradition, unless not sustainable	1			1
farm cannot get back its cost of production in most years, let alone a living allowance or return on investment		1		1
heritage - kids in high school			1	1
hers	1			1
hopeful but unsure			1	1
hopeful that they'll take over	1			1
income has been brutal for 10 years		1		1
interested	1			1
interested son	1			1
keep tradition	1			1
kids interested	1			1
land worth lots right now	1			1
long time away, lots could change			1	1
long ways			1	1
nice way of living but hard	1			1
no future in it		1		1
no kids			1	1
no kids, unless nephew takes it		1		1
No money in farming		2		2
no money in it		2		2
no one interested		1		1
nobody to take		1		1
nobody wants to farm		1		1
not big enough		1		1
not enough money for product - not viable		1		1

not in ag industry			1	1
not interested		1		1
not sure if viable			1	1
only 4 years - wouldn't encourage			1	1
pressure to sell for acreage lots			1	1
son interested	1			1
son wants to	3			3
still viable - big enough to make it work	1			1
things change, uncertain			1	1
too expensive; future not looking great			1	1
too small		1		1
tradition	2			2
went and got educated - won't come back		1		1
wouldn't mind but don't anticipate			1	1
youngest son loves it	1			1
Grand Total	22	20	16	58

Table 2. Do you practice farm direct marketing? (i.e., do you own a U-Pick, or sell food for consumption off your farm, or at a farmers market?) Why or why not? (Q.A10)

Response	Yes	No	Grand Total
alternative to conventional - need it for organics	1		1
can't - bound by wheat board		1	1
can't make living in old way	1		1
dad started that	1		1
directly to feedlots	1		1
doesn't work well there		1	1
get better value	1		1
get rid of product - no place to get rid of product after BSE	1		1
how else can I move my over 30 month cattle	1		1
just a bit - experimenting, freezer sale	1		1
just haven't found right thing		1	1
labour intensive; distance from market		1	1
last year was a learning year; currently investigating		1	1
love plants	1		1
make more; its cheaper for consumer	1		1
never thought of it		1	1
No other hay brokers in area	1		1
raised grain, wheat board sells it; barley to food coop		1	1
to get better returns for themselves	1		1
too old for that		1	1
Grand Total	12	8	20

Table 3. Please list the organizations (e.g., church, producer groups, recreation groups, etc.) that you are a member of in the space below, and estimate how many times per year you meet with each group. Most people did not indicate which organization they felt the most involved with. (Q.C14)

Response	Total
AB Beef Producers	1
AB Beef Producers; Grazing Co-op, community assoc.	1
Alberta Milk	1
biological	1
Bison Producers of AB; Grazing Assoc; Wheat Board	1
Canadian Canola Association; UFA; Agricor (shares)	1
church group; AISC forums (producer group); Taber-Kyoto; 4H assistant	1
church group; basketball; CARA; AESA	1
church group; rec group	1
church groups	1
church groups; AB Natural Health Agricultural Network; Learn Agrifood Network; Branding the Peace County Assoc; Peace Valley Added; Go Organic	1
church groups; Certifying Organic groups	1
church groups; Norhtern AB Grazing Assoc.	1
church; AB Wheat Producers; rec groups	1
church; Chinook Applied Research Assoc.	1
church; curling rink;	1
church; golf league; community club	1
church; producer group; friends	1
church; UFA	1
church; water coop; Agricor	1
community board; church	1
community club; Water Co-op; Irrigation Assoc.; school division	1
curling; Sale A Bull; Grazing Assoc.	1
Dairy Group	1
Dakota Women; Ag Society; Library Friends; Women's Institute	1
Delia 2000 Conservation Club	1
Fairview Water Coop; church; AESA; Rotary club; Fairview Applied Research Assoc.	1
Hall board; Marketing club	1
Historical Society; Agri Food; Friends of Unpolluted Living; Smoky River Ag Society	1
Lethbridge Motorcycle Club; figure skating	1
marketing group; Potato Growers of AB; rec groups	1
producer marketing - Pike Management Group	1
R of C	1
rec groups; church group	1
rec hockey	1
sports groups	1
Water Coop	1

Water Coop; Gas Coop; Knights of Columbus; Parents Council at school	1
Western Hog Exchange	1
Whitlaw Community Club	1
Wild rose Agriculture member	1
Grand Total	41

Table 4. In your opinion, what are the signs of a “good farmer”? (Q.C21)

Response	Total
- don't let animals starve (they are content); no garbage around farm (clean yard); lots of pasture and bedding (comfortable for animals and their preference)	1
able to maintain land; produce viable products; try to make living	1
adapt to your environment/ability; weed control; condition of crops and pasture	1
all goes back to land; pasture management	1
all good - no bad farmer; weeds bad farmer; summer fallow bad; over-grazing bad	1
anybody who can make money; weeds under control; good crop	1
bills paid; well maintained buildings, equipment; produces good crop	1
can cover his cost of production; able to support his family; fair return of agricultural investment; leaves trees on fencelines and willows in low spots	1
clean land - weed free	1
clean operation (yard, etc.); healthy livestock; good crops	1
clean summer fallow; prefer to see chem fallow - soil erosion a big issue	1
clean; looks after environment; raising good crop	1
community minded person; farms sustainably (economically); can raise family on farm without another job and still do fun things (trips, etc.)	1
concerned about family farm; contributes to community; interested in world events - we are a global communtiy; state of buildings, machinery	1
cost of production (all costs to market value); living allowance must be allowed to support his family; fair return on investment	1
dirt doesn't blow; good crops;	1
does a good job; clean fields; nice looking cows	1
does his best job at what he's doing; concerns of those around and what is around him; won't drastically effect his neighbours or those in his producer group	1
does the best he can; gets best seed, best fertilizer, not used too much; does conservation; insures properly; not necessarily one who makes most $, but one who's land is still good	1
don't abuse land; cows well fed; don't take a short term view	1
fat, happy, unstressed animals; general maintenance of farm; soil in good shape; still have wildlife around their place; don't care if they have weeds; farmer and family happy	1
good business man - gets reasonable returns on investment which means good cropping management; quality of crop	1
good crops	1
good crops; no weeds in fields; timing - seeding and harvesting; keeps	1

machinery up; looks after environment - doesn't misuse it; works with neighbors	
good looking yard and equipment; good crop	1
good manager - land, people, finances; weed control; timeliness of crop, etc.; cleanliness	1
has an eye for the environment; has to follow new practices and be up-to-date; have a clean yard and farm	1
have to be a steward of the land; be aware of what works in area	1
health of stock	1
healthy crops, animals, land	1
healthy grass; healthy cattle; land doesn't blow and is looked after	1
keeps fields clean and cultivated; maintains yard and machinery	1
knowledge - converses intelligently about issues	1
left over grass to start next season	1
look after environment; adopted practices of concern	1
look after land, soil (don't use fertilizer, doesn't blow away)	1
looking after land and yield	1
looks after land and makes most money doing it; look at pasture, how they are grazing (eg. piping in water)	1
looks after land/ environment; raises good crops and animals;	1
make a viable living; be a supporting member of community; good weed control	1
makes a decent living; keep good care of land as possible; not a bunch of junk sitting around; clean yard	1
makes a living	1
making good use of land; animal health	1
making money; look of land	1
manages production well; products are good, animals well cared for; fields well seeded, maintained, not patchy	1
neatness; state of animals	1
no weeds; out in field early (esp. here because so hot in summer)	1
ones that look after land; weeds; cleanliness; how fields look	1
pastures not over grazed - leftover for next season; how cattle look; state of fences; machinery	1
pay debts; keep place fairly tidy	1
people happy with what they are doing and runa good show; can tell when you drive to their yard	1
practices that leave as small a footprint as possible; good stubble; chem fallow is a real sign of progressive attitude	1
practices, how they take care of the land; pride; how crop comes up and what it looks like; cleanliness of fields and homes	1
someone who is able to adapt and practices soil conservation	1
someone who is successful farming; state of farmstead and buildings	1
someone who looks after land; clean fields (not weedy); clean summer fallow; does good farming	1
straight lines in field; wildlife	1
takes care of land, and doesn’t farm for programs (i.e., to capitalize on insurance, etc.); doesn’t have dirty summer fallow	1

taking care of land	1
tidy summer fallow; clean machinery; well maintained yard	1
using land in a productive and positive way; work done	1
weed control; good yields; not hurting environment	1
Grand Total	62

Table 5. Who (or what) has been the greatest influence on the way you farm? (Q.C22)

Response	Total
always being a student, always learning	1
brothers	1
CARA	1
customers - what their needs are; the land	1
dad	6
dad and friends	1
economic situation	1
economics	2
family	1
father	8
father; looking at others	1
financial; low-risk	1
getting into potatoes 5 years ago brought biggest change to his operation and changed future - intensified farm improved finances	1
gov taxation	1
her grandparents	1
his own gumption; lots of reading, etc.	1
his personal values	1
husband, through his Dad	1
just them	1
maximizing return on investment	1
mother in law; being involved with CARA	1
neighbor	1
neighbors and dad	1
other successful farmers	1
other successful farmers/ranchers	1
owner	1
parents	3
parents and grandparents attitude towards soil	1
price they get for grain	1
prices	1
profitability and conscience	1
ranch he worked for out of high school	1
reading magazines; talking to neighbors; experimenting; trial and error	1
reading/ magazines about different ideas	1
soil conservation	1

the bottom line	1
the way his dad operated	1
themselves - they try to do their best and adapt to conditions present	1
trying to make a living	1
watching practices of neighbors who are good farmers	1
watching wind blow topsoil - changed from cultivating to summer fallow	1
weather (semi-arid)	1
weather conditions; economy	1
weather here (drought, blowing soil)	1
what he sees of the environment - his experience	1
wind	1
Grand Total	61

Table 6. Could you list some other important influences on the way you farm? (Q.C23)

Response	Total
asks for advice from experts	1
brother	1
check out neighbors methods; forced to listen to gov lease inspectors	1
comes down to $	1
commoduty prices; high input costs	1
dad	1
Delia 2000 Club; land erosion in past; gov programs such as PFRA, EFP	1
do the opposite of gov and conservation tell you; drought	1
dry weather; ever rising costs with no hope of getting cost of production	1
economics	1
efficiency; marketplace	1
family	1
family history, legacy	1
farm articles in paper	1
financial	1
forced to produce what people demand, how and when	1
friends who farm	1
friends, neighbours	1
friends/neighbors	1
go to farm conferences	1
going to organic meetings	1
gov and other research institutes	1
grain and commodity prices	1
grain prices; terrible condition of farmers	1
grandfather	2
hands-on experience; reading; brother in law;	1
her parents; Rudolph Steiner's stuff interesting	1
his vision of keeping his business sustainable; farm in tune with nature rather than just with productivity in mind	1

increasing input prices - fuel, fertilizer, etc.; business decisions, relationships that left "lessons learned"	1
information from AAFRD	1
love of land - care for it	1
make a living - support family	1
marketing of crops	1
markets	1
neighbors; over time - everyone in general	1
neighbours	1
other successful farmers; articles/ papers	1
prices	1
reading info from David Suzuki; reading books and pamphlets	1
watch others; go to seminars	1
weather; economics	1
wife	1
Grand Total	43

Table 7. Are producers who adopt conservation practices generally well-respected in your community? Why or why not? (Q.C24)

Response	Total
also profitable	1
also successful farmers	1
better for countryside; good for future	1
can have a wreck if don't around here because blowing land inpacts neighbors; certain practices are important	1
caring for generations down the road	1
concerned about environment	1
conscious of environment	1
depends on history of who's doing it - if a "wing-nut" nothing looks good	1
depends on the conservation aspect than anything else	1
doing what they can for next generation	1
don't hear it talked about a lot	1
economically decided, makes sense	1
everybody likes nature	1
everyone always interested and then adopt it	1
everyone is accepted unless doing really bad stuff (good sense of community "All in it together")	1
everyone should do their best	1
expenses	1
experiments can raise some eyebrows but in the end people respect the innovators because they work	1
for betterment of land	1
get better use out of land	1

good for environment	1
have more disposable income; willing to take more risk	1
here - conservation practices are looking after the grass	1
here when you adopt conservation practices people think you're a good operator; look after land it makes you money	1
ideal situation - less tillage, fuel prices	1
if you do it properly it can be done both ways without hurting land	1
indicator of someone looking forward, looking to maintain operation	1
its acknowledged that conservation practices help wildlife and nature in general	1
keep extra wildlife around	1
least (work)? it better off you are	1
like grand-standing	1
lots of conservation-minded people in community	1
more progressive farmers have adopted	1
most people around here would think he's an oddball - he does what his conscience tells him	1
most people conscious about that - if you don't someone start talking you for not doing part	1
neighbors affect neighbors	1
no abuse of any kind; seems all are doing well	1
no bad farmer - don't pollute world, don't waste water, etc.	1
nobody is doing conservation	1
often people have been doing conservation as a matter of course, not because people told them	1
own business	1
people doing it are "deep thinkers"	1
people seeing better results from better practices	1
people think they're weird - maybe it’s a threat to them	1
seeing dust storms makes	1
seem successful - they make a good effort	1
show pride, stewardship, in it for the long haul, more than just a job	1
shows you care for yourself and future generations	1
small community and people talk	1
some don't buy the environmental stuff	1
their lifestyle; it just looks like they are abusing it to get the most they can out of it	1
they've always been the oddball family	1
we all have the same opinion on conservation	1
Grand Total	53

Table 8. What do you see as the biggest future challenges that your farm will face: (QD.25) in the short term (1-5 years)?

Response	Total
"making it" because of increasing prices and low returns	1
all the development (move or stay)	1
being viable, will they pay enough	1
cash flow	1
cattle prices - result of politics/bureaucracy	1
commodity prices	6
commodity prices (fertilizers, etc.)	1
cost of production has to be addressed	1
crop prices; price of goods	1
drought/grasshoppers	1
drought; BSE; low commodity prices, keeping business sustainable	1
economic and global warming	1
economic sustainability	1
economics	1
economics - commodity prices	1
economics and political decisions (all political decisions and they don't have control)	1
escalating costs coupled with stagnant returns	1
expenses	1
getting more than break-even for cattle	1
getting things organized and making it a healthy business	1
have good farm labour	1
health issues	1
how to sell grain for biggest price (because of wheat board)	1
increased value of CAD $; high input prices	1
inputs and commodity prices; labour shortage	1
keep it going because can't make a decent living	1
keeping above financially	1
lack of price for grain	1
low prices; drought	1
make money	1
make money/break even	1
making a profit	1
making enough $ to live	2
making income to keep everyone on farm	1
making it viable	1
making land payments	1
manure management	1
market - commodities	1
market for grain and low commodity prices	1
marketability - cost of inputs	1

more people coming into the area; highway here, increasing recreational use	1
more truth be known about something before producers blamed eg. BSE	1
need gov subsidies (current gov programs not working)	1
need return on product; productivity, what you can produce	1
no young people wanting to take over; prices/commodities	1
paying bills/financial considerations	1
price of grain/inputs	1
prices	1
producing crops with returns to pay for inputs	1
production costs / commodity	1
return on land; oil industry	1
survival	1
survival - grain prices/movement nil; costs higher	1
surviving - price of fuel, commodities	1
surviving low prices	1
the economy	1
water conservation; weather; oil and gas	1
weeds	1
Grand Total	64

in the long term (over 6 years from now)?

Response	Total
"making it" because of increasing prices and low returns	1
being viable, will they pay enough	1
cash flow	1
cattle prices - result of politics/bureaucracy	1
commodity prices	4
commodity prices (fertilizers, etc.)	1
continued operations, and growth on what we started on. Being able to move away from being dictated by market, to being able to produce to one's own goals, and in the way one wishes to farm	1
cost of inputs/prices	1
crop prices; price of goods	1
economic and global warming	1
economic sustainability	1
expanding for future and sons; stay healthy	1
financial failure making generational takeover impossible	1
financial failure the next generation cannot take over it is impossible	1
finding more diseases in grains	1
finding someone to buy it when done	1
government is intervening in the wrong ways, we need to get them involved in correct methods	1
have to get gov subsidies to compete with US and Europe	1
health issues	1

if can get help	1
if children interested in farm	1
if we get paid for what we do all good	1
increased value of CAD $; high input prices	1
int'l market issues/global competition	1
keep it going because can't make a decent living	1
lack of price for grain	1
make money	1
make money/pay for the thing	1
making a profit	1
making enough $ to live	1
making income to keep everyone on farm	1
making it viable	1
making money and being a viable size (thinks he will have to get bigger)	1
market - commodities	1
markets - demand	1
more people coming into the area; highway here, increasing recreational use	1
need gov subsidies (current gov programs not working)	1
need to get away from thinking farms are blue-collar workers - gov needs to change relationship to farmers	1
no young people wanting to take over; prices/commodities	1
paying long-term debts; adding value; making sure markets	1
price of grain/inputs	1
prices	1
production costs / commodity	1
smaller farms will disappear, no rural community	1
survival - grain prices/movement nil; costs higher	1
surviving - price of fuel, commodities	1
the economy	1
the way of farming – the small ones are being pushed out. The price of inputs are too high	1
things will turn around - don't like to see land prices decreasing	1
to try and get his wheat’s protein levels up (to sell to the Japan market); high quality wheat; and to go to no till as an organic producer.	1
trying to get ahead	1
urbanization	1
water conservation; weather; oil and gas	1
would be nice to get into grazing management with other people's cows	1
Grand Total	57

Table 9. Which agricultural practices cause you concern for the land, water, or your family? (QD.28b)

Response	Total
amount of chemicals on land; cultivated light sandy soil, it blows	1
amt of chemicals with grain; amt of fertilizers - land is burnt out	1
are drugs really safe	1
chemical and fuel storage	1
chemical use	1
chemical use; diverting water to feed new streams	1
chemicals - get them safe and decent he'd be OK	1
closer/tight rotations on special crops - drawing on soil reserves	1
contaminating from spray	1
cultivating land here - blows soil	1
dead animals in river (in past)	1
don't like herbicides and pesticides; don't like large farms;	1
don't like spraying chemicals	1
dugout water from run-off; large intensive livestock operations	1
fall burn-off applications	1
farms for sale, communities disappearing, hutterites buying up land	1
fertilizers; "super weeds"; GMOs; pesticides and insecticides	1
fertilizers; chemical sprays	1
fuel handling; spraying chemicals; chemical residue	1
hydrous ammonia	1
increasing use of pesticides/herbicides; intensive livestock operations	1
intensive cultivation; unknowledgable use of pesticides	1
intensive practices	1
leaching of fertilizers/chemicals	1
manure management and feedlot placement	1
manure management; water runoff that enters water	1
not allowed to clean their own seed	1
over farming, over grazing	1
overgrazing; water issues	1
people feeding livestock close to water sources	1
pesticide use; manure management; water conservation; fertilizer use; fuel consumption	1
pipeline breaking on pasture (1.5 hours from house so delay on clean up)	1
probably but can't think of anything specific	1
PTO - power take off on tractor - dangerous, disregard	1
run-off to water (can't eliminate all of it)	1
seed treatment; chemicals; grain dust; lubricants (heavy metals); exhaust	1
soil erosion; runoffs from erosion; chemicals	1
some chemicals shouldn't be allowed; over-applying manure; runoff from feedlots, cow/calf	1
spraying chemicals	2
spraying chemicals; continuous cropping; and ammonia nitrate	1

spraying wrong	1
sprays, insecticides, chemicals, treating seed	1
too much tillage - should not be used in some areas	1
water safety issues - chemicals, spraying	1
zoning - putting feedlot, hog farm on waterway	1
Grand Total	46

Table 10. Does the above practice concern you more in terms of the land, the water or your family? (Q.D28c)

Response	Total
employees and himself; some concerns for land	1
family	3
family, helath	1
family, water	1
family; possible water	1
helath of food	1
land	7
land and family; keep operation sustainable	1
land, family, water	2
land, water	1
land, water, family	3
land; water, family	1
land; water; family	5
personal health	1
personal safety	1
water	8
water, family	2
water; family	2
Grand Total	42

Table 11. What are some of the steps you have taken in the last 3 years to reduce the impact of your agricultural practices on the health of the land, water or your family? (Q.D30a)

Response	Total
always did it - proper pasture management, more crop rotation	1
bench spraying; cultivate in between rows; AEFP	1
changed oil disposal; pesticide storage system;	1
chem fallow - cut down on the harsh chemicals	1
chem fallow; direct seed	1
chem fallow; pesticide storage; fuel storage	1
chem fallow; spills chemicals - min	1
chemical handling	1
conservation till	1
conservation till; chem fallow	1
corrals located away from water source; fuel supply monitored daily to ensure no	1

leaks; taken steps for chemical storage	
cross fencing pastures	1
direct seed; chem fallow	1
direct seeding; cut down on chemical use	1
direct seeding; don't overgraze; spread manure on land	1
direct seeding; leave stubble	1
doesn't spray as much as others; just once and then he works the land. He has a good pesticide storage system (class 3?)	1
don't farm much; put minimum amt of chemicals ; land not cultivated	1
don't use herbicides, pesticides, fertilizers (economics and health)	1
economic rationale; look after grass a little better	1
fenced riparian areas to keep erosion under control; don't do confinement (on pasture) so manure doesn't concentrate	1
fenced river; put in dugout and fenced it; planting trees but concerned about water needs	1
fencing off ravine - making a lake; drilled well for cows	1
follow up-to-date protocols for fertilizer application, crops, everything	1
from cultivating to chem fallow; tried organics for a while, weeds changed his mind	1
got dad to finally quit spraying	1
GPS; no till; chem fallow; direct seed;dust masks; filters	1
inoculant for micro-organisms; put down clover; green manure	1
less tillage	1
manure goes onto land; dry manure	1
minimized run-off, low dose spray system	1
minimum till	1
no chemicals / little	1
no till	1
no till; EFP; planted trees for windbreaks; still have ~60 a of bush on their land for wildlife	1
put into hay	1
quit spraying for weeds; don't do continuous cropping - may put some land back to grass	1
reduce tillage; apply organic fertilizer; keep native grasses; better watering systems (keep cattle out of waterways);	1
re-grassing some prairies where water runs a lot	1
re-seeding cropland to grass; put in dugouts so cattle don't have to walk more than 1/2 mile	1
rotational grazing; calving later; run tractor less; cross-fencing	1
seed winter wheat for DU; store chemicals differently; chem fallow	1
spraying at the right time; conserving	1
stop adding fertilizer; use as little chemicals as possible	1
storing of chemicals; pulling out canal instead of well;	1
use no chemicals or chemical fertilizer; test hole drilling - they don't let that because it contaminates	1
use very little pesticides; grow lots of peas for fertilizer and cut back on fungicide	1

use; grow oats;	
water management (controlled watering of crops); reduced tillage; soil and plant testing so don't over-fertilize; using approved chemicals	1
zero till	2
zero till; contour hills	1
zero till; direct seeding; rotational grazing	1
zero till; improved water quality for livestock	1
zero till; used oil management; use troughs so animals don't go into dugout	1
zero tillage	1
Grand Total	55

Table 12. Did you take the above steps for more the health of the land, the water, or your family? (Q.D30b)

Response	Total
economic/business decision	1
economics	2
economics; land	1
family	3
health of workers	1
his health; water	1
keep ahead of trends	1
land	16
land and economic sense	1
land and family	1
land, animals	1
land, family, water	3
land, water	2
land, water, family	3
land/water	1
land; water; family	3
water	1
water, land	1
Grand Total	43

Table 13. Aside from financial incentives, what would encourage you to adopt other conservation practices? (Q.D33)

Response	Total
always open to conserving environment - if something comes along they'll do it	1
better, more efficient stuff	1
concern for land	1
don't go too far overboard	1
found something they believe is good for soil or sustainability of farm	1
having the time to do them	1

health and well being of humans and nature	1
health of soil - building organic matter is key to sustainable agriculture	1
if could see improvement in quality of land and livelihood	1
if got scared and worried something was happening to land	1
if he could see an improvement in plant growth or save an endangered species	1
if he thinks its good he does it	1
if it makes sense he'd do it	1
if it would work here and contributes to our overall operation (do it if we could afford to)	1
if saw there was something that would produce better or save land	1
if there was something better than really worked	1
if there's a benefit (helped land or people) it would be considered	1
if there's something where a conservation would help they'd do it; do it for ranch and personal gain	1
it makes sense for "here"	1
keep environment good	1
keep land good - shown to improve quality of land	1
land becomes richer, higher value	1
likes nature	1
long-term benefit; something tangible, visible; show what it can do	1
mandated to do it	1
more knowledge of what it is, what it can do	1
need to have a proven benefit to environment or health	1
preserve environment	1
research showing benefits; proof chemicals don't kill you	1
retaining the beauty or general look of the area	1
see a net benefit on soil biology or some other proof that is works better than other practices	1
shown benefit to family or planet	1
some extreme weather conditions	1
taking care of nature	1
the things that work	1
time and money	1
to let land be turned back (over-farmed) - they are already doing it; drought hit it hard	1
we don't need carrot and stick, we need cost of production	1
well-being; ethics to do so	1
Grand Total	39

Table 14. Are you more likely to adopt conservation practices on land that you own rather than rent? Why or why not? (Q.D34)

Response	Yes	No	Depends	Not Applicable	Grand Total
all in family	1				1
at least one landlord is just as invested in conservation as us		1			1
costs more to do it right	1				1
depends on practice, some land better for it			1		1
difference might not come for 5 years and might not be renting it anymore	1				1
do it for soil and economics		1			1
does same things	1				1
don't get anything from improvements	1				1
don't see the point		1			1
farms the same, doesn't differentiate		1			1
he rents from a guy in Ireland - she's a conservationist		1			1
if already doing it on your own, won't cost more to do it on rented land		1			1
if economically sound they'd do it; depends on landowner as well	1				1
if he can do it he'll do it anywhere		1			1
if he practices it he'll do it on his neighbors land as well		1			1
if he was sticking around - thinking more of future (short term vs. long term)	1				1
investing time in something that is ours	1				1
its mine	1				1
its to your greatest benefit as opposed to rented	1				1
its yours	1				1
keep it all the same		1			1
keep it the same (do what I do)		1			1
land is land - not doing it just for himself, doing it for future, for land, for wildlife		1			1
landowner would have to be in agreement	1				1
lease - but still theirs - do same on all of it		1			1
longer term benefits if no stable stake in land, makes no sense			1		1
look after own first				1	1

might lose rented land - do it on own first	1				1
more on own than rented, but if on land for long time it's a different story			1		1
no, do the same		1			1
not going to change practices on land they rent - seen improvements on rented land		1			1
not going to spend money on neighbor's land if he'll sell to someone else; long-term rental is different	1				1
only benefits everybody; if win they win, if lose they lost		1			1
only rent off sister so no but if other maybe yes				1	1
rented - lose benefits	1				1
rented land uncertain	1				1
renting - no benefit at final end depending on rent contracts - if there's a benefit be the same; long-term lease with benefits better incentive	1				1
renting might not have benefit but their lease is tradable so they benefit in end		1			1
see more value in it	1				1
treat all the same		1			1
unless landlord says no		1			1
unless rent to own	1				1
we rented land because hope to purchase it		1			1
would do same		1			1
Grand Total	19	20	3	2	44

Table 15. What is most important to you about being a farmer? (Q.D35)

Response	Total
ability to see what he's accomplished and know he has done it; working for himself and not answering to others; feels pride in doing something independently	1
at one time it was a way of life, now its just a business	1
be able to sustain operation; able to operate in the manner he sees best for him and others around him; make his own decisions	1
be own boss, do what you want	1
being boss, manager	1
being outdoors; being own boss; independence of time; more freedom	1
being own boss	1
being own boss; controlling own destiny	1
being own boss; working with nature	1

challenging - trying to manage portion of ecosystem and make a living on it	1
changed - satisfaction in well done	1
enjoy the challenge	1
environment	1
family farm - carrying on tradition; love the farming part	1
free lifestyle; own boss; like nature, outdoors	1
freedom to operate on own	1
growing grain that helps feed the world	1
having a good life	1
independence, his own decisions, own boss	1
its not short-term, there is a future	1
just what you wanted to do; didn't know any better; way of life	1
leaving land in better condition than when he started	1
lifestyle	2
lifestyle - always owned this land	1
lifestyle - being outdoors; able to do own thing (sort of)	1
lifestyle - being own boss	1
lifestyle - can do what you want, when you want	1
lifestyle - chooses own hours, be own boss	1
lifestyle (peace and quiet; raising children; freedom)	1
lifestyle, don't make lots of $ but own boss, free, able to do what you like	1
lifestyle; enjoy working outdoors and with animals; very rewarding and hard work	1
lifestyle; enjoyment of nature	1
lifestyle; feel like benefitting society	1
lifestyle; flexibility, freedom	1
lifestyle; own boss	2
lifestyle; take pride in growing good crop and raising good animals	1
like to say my own boss but probably not true	1
living where its nice and clean, air smells fresh; doing what I like to do - raising cattle	1
long term profit/success (viable); not take more off than put in	1
looking after animals	1
love of the land; being own boss; marketing own product	1
make own decisions	1
making a living; way of life	1
no boss	1
not a 9-5 job; lifestyle	1
not being in city; being own boss (do what he wants, when he wants)	1
not just a job, a way of life (lifestyle); enjoys doing it	1
outdoor life, solitude, nature	1
own boss - own decisions	1
own boss; being out in country	1
own boss; feed the world	1
pride of working with land - putting in seed and watching it grow; likes animals (cows)	1
produce viable product that you are paid its worth for; keeping land sustainable;	1

being able to run cattle on good land;	
producing food for world; love doing it	1
raising healthy food for people who want it; looking for something outside the box	1
sense of accomplishment; sustain a viable family unit	1
stewardship of land; family	1
to be able to make a decent living at it	1
way of life; best place to raise kids and grandkids; in touch with nature - know what's going on	1
We love the land; has been in my family for almost 100 years	1
Grand Total	62

Table 16. What can information sources do to make conservation information more useful for you? (Q.E39)

Response	Total
already lots available, its up to the farmer to search it out	1
already quite a bit out there	1
already there, just depends if you want to access it	1
change the idea of conservation, realize they don't know what they want to conserve	1
demonstration - field tours	1
EFP - should have had more copies of references right there instead of giving coordinates for other sites (water well reports and internet)	1
field days - show trials, equipment; testimonials from other farmers	1
get it out more	1
get people more aware by advertising - radio/television	1
give data	1
give them information on how to practice them (the practices); how to put them into effect	1
have a real person answer the phone	1
have more community meetings, test plots, brochures, tours to show what's out there	1
have workshop on practical working places that real ranchers are using	1
its there if you want it	1
its there if you want to use it you can, esp. if don't have to listen to the guy holding it	1
keep it simplified - less complicated, more apt to read it unless earth shattering	1
laymen's terms	1
local info for here and out of #2 corridor	1
localized info; someone who knows area	1
make it easier to understand - CAIS is a real problem because of the complexity - need an accountant to do it	1
make it more easily accessible or it out there point the way	1
more hands-on, in-field demos; make it easier to get	1
need info from areas like here with wind and moisture issues - long-term	1
newsletter sufficeint	1

pamphlets or leaflets; knowing where specialists are	1
promote it so he can think about it	1
put it out so we can judge it	1
radio	1
seminar in town, people can go see it	1
tailor to be more unique to a person's unique situation eg. potato farming	1
they are already seeking it out	1
use media - TV, radio, magazines	1
varieties of wheat	1
work with real examples not just on paper, specifically designed and executed in this area	1
would like to travel to see how people farm in S. America, etc.	1
Grand Total	36

Table 17. Why do you feel the conservation information being promoted in your community is NOT relevant to your farm or farming situation? (Q.E40)

Response	Total
common sense, already doing it	1
doesn't fit uniqueness of area	1
for more northern farmers	1
he “feels there is too much emphasis saying you have to seed every acre you’ve got”; everyone is saying that summer fallow is “a no-no, and this is coming from government” – he doesn’t agree with this. He thinks seeding every acre is more costly	1
its relevant but geared to big farms	1
no need for "conservation"	1
people pushing chemicals, doesn't agree, esp. fo this area	1
sees the erosion issues	1
Grand Total	8

Table 18. Do you believe the government should be promoting conservation practices for farming? Why or why not? (Q.E41)

Response	Yes	No	Grand Total
and also in oil patch; should be getting Red Deer River water here	1		1
as a general agricultural benefit	1		1
at least making people aware	1		1
be easier for us to be better stewards	1		1
be helping the farmers out	1		1
because how you treat the land and the environment has a lot to do with what is left for our children and grandchildren.	1		1
big feedlots and hog farms need to be monitored and regulated	1		1
educating	1		1
everyone should practice it; should just look after it	1		1

farm policy should cover the cost of production on average. Fair return on investment and a wage for producers. This farm program in Quebec is called "Azura"	1		1
farmers left are already doing it		1	1
for the younger farmers - he's not concerned with that	1		1
gov could give incentives to help those interested	1		1
gov should help with stopping imports, help farmer	1		1
government should get out of farming – leave it to private enterprise	1	1	
has tools to announce things	1		1
have to balance it with corporate farms because they're not going to have the time to deal with it - need to keep small guys (family farms) because small guys care - big guys no time	1		1
if its good practice (economical reward) then people wil do it		1	1
if they are practical and economical and not all the stupidity; gov bureaucracy don't listen to us; education and not practical knowledge dictating policy	1		1
incentives a good way to go; having info for farmers ahead of time (CBM stuff a bit slow - AENV catering more to oil companies)	1		1
incentives can help sway the ones who don't want to pay to change	1		1
keep on right track	1		1
listen to gov last - set rules that we need to follow; listen more to gov than ind. Org.	1		1
long term thing - can't ruin it	1		1
more people should do it	1		1
most people will respect the gov more than they will respect others	1		1
no problem with it	1		1
not if talking about no till because it’s a scam - chemicals in soil not conservation	1	1	
not necessary here but maybe in other areas	1		1
not taking steps to stop certain practices. Specifically, she thinks more land should be allowed to go unfarmed, and she thinks there should be a way to stop those who are just farming for crop insurance	1		1
nothing wrong in it, for betterment of all	1		1
other more imp things to do like marketing and helping us survive	1	1	
present it to us so we can manage it, but sometimes they suggest these things that we just can’t afford to manage. They seem to overlook those sort of practical, or feasible sorts of things.	1		1
promote good stewardship	1		1
promoting not with iron fist; depends on what conservation stuff they are promoting; Kyoto, getting rid of older equip not good idea; endangered species legislation could do more harm than good since people will “get rid” of those animals if they find the	1		1
public reception good for farming	1		1
push adoption to get greater uptake	1		1
seems logical	1		1
should be promoting bigger prices for grain; are issues to deal with	1		1

should only be there for technical or financial assistance and leave the rest to the farmer	1	1	
so its not wrecking water, etc.	1		1
soil quality - sees bad practices still being done - ruining soil	1		1
some people need it; diminishing returns - ones who take already have	1		1
somebody better	1		1
someone should be doing it	1		1
someone should do it but they shouldn't make all kinds of laws and regualtions - will end up making things worse	1		1
sometimes gov can be pushy - They should present the options but then leave it up to farmers	1		1
sometimes gov makes good decisions on managing things - sometimes needed to get people to adopt	1		1
sometimes not practical - farm programs too complicated or don't work fast enough	1		1
sustainability of "farming"; make programs to help him	1		1
they have a lot of influence and access to information	1		1
they have the resources to do it and the avenues to get it out there	1		1
to a certain extent; like to get results so the gov gives money to fund research	1		1
to keep land viable/sustaianble	1		1
up to farmer	1		1
with money - OK		1	1
Grand Total	49	7	56

Farm Direct Marketing

Table 19. What are some of the steps you have taken in the last 3 years to make the food products you farm direct market safe? (Q.2)

Response	Total
try to feed them safely – don't use artificial	1
slaughtered at inspected plant	

Table 20. For the best practices that you were aware of, please indicate **whether you have adopted the practices or not**, and in a few words **explain why or why not**. (n=2) (Q.3b)

Food Safety Practices	Response	Total
Premises	Have been certified by health unit for Level 1 – at basic level (will go higher if it works)	2
	Has to be done	
Transportation and Storage	Not at that stage	1
Equipment	Not at that stage	1
Personnel	Not at that stage	1

Sanitation	Do that anyway as matter of course	1
Recall	They are in contact with consumer	1

Table 21. Will you adopt food safety practices for each level of the food manufacturing process that you are involved with (*i.e., the production, processing, and/or marketing level*)? (n=3) (Q.4)

Response	Total
Requirement / protects them and consumer	1
Already have	1
Don't want anybody dying	1
economic reasons	

Table 22. What would allow (or convince) you to adopt food safety practices in your farm direct business, at each level of the food manufacturing process (*i.e., production, processing, and/or marketing level*)? (n=3) (Q.5)

Response	Total
Some financial assistance from government	1
input from the people administering standards	
clear up standards, protocol, etc.	
Feels he adopted everything he can	1
Already doing	1

Table 23. What is preventing you from adopting food safety best practices? (n=2) (Q.6)

Response	Total
Not at that stage yet	1
No	1

Table 24. What benefits do food safety best practices offer your business? (n=2) (Q.7)

Response	Total
customer confidence	1
protecting business	
Shipping out good quality (99.9%)	1

Table 25. What benefits do you see in selling directly to the consumer? (n=4) (Q.8)

Response	Total
direct financial benefit	1
no middle man	
reduction of cost to consumer – more tailored products to consumer too	

Spring wheat – through a broker	1
Good money	1
Looking for other ways to make money from buffalo because prices so bad from that	1

Table 26. What societal or consumer trends influence your farming practices? (n=3) (Q.9)

Response	Total
natural/organic trends – consumers want to know where products are coming from	1
Produce better quality	1
Everyone is BBQing (steaks, burgers) – no roasts like old days	1