



Information sources and methods used by progressive farmers in the learning process
by Larry Lowell Stephens

A thesis submitted in partial fulfillment of the requirements for the degree of Doctor of Education
Montana State University
© Copyright by Larry Lowell Stephens (1991)

Abstract:

In this world of constant change, some of the most significant changes essential to the survival of mankind have taken place in the area of agriculture. Farming methods, equipment, and plant varieties have become obsolete as new and better alternatives have been developed to increase production and preserve the resources available. These changes in farming practices have important practical implications for farmers.

There is a need for an increase in understanding how farmers go about gaining new skills, knowledge, or promoting change to meet the demands that are placed on him/her, the family, and the farm. The purpose of this study was to explore and describe the learning procedures and sources used by individual progressive farmers who have been involved in this learning process.

The major data gathering technique was recording perceptual observations and comments gained from 50 interviews with selected progressive farmers from 10 counties in southeastern Idaho. These farmers were selected from local farm support groups who worked with the farmers in each of the counties.

The farmers were active information seekers. They were very self-directed in their learning activities and wanted to use the fastest and easiest methods available to gather information and sought applied learning for the immediate situation. Learning strategies varied among farmers with each farmer being involved with a multitude of learning styles and methods. Each farmer used many sources to obtain information and did not seem to be dissuaded by cost or distance. They demonstrated a great deal of creativity in their use and variety of resources and in their participation in self-initiated experimentation and research.

Farmers of today overcome barriers and obstacles to participate in learning and opt for increasing present knowledge, gaining new skills, and promoting change in their lives as well as on their farms. They seek information in all they do and consider learning, keeping current with new technologies, and accepting change as integral factors to their success.

INFORMATION SOURCES AND METHODS
USED BY PROGRESSIVE FARMERS IN
THE LEARNING PROCESS

by

Larry Lowell Stephens

A thesis submitted in partial fulfillment
of the requirements for the degree

of

Doctor of Education

MONTANA STATE UNIVERSITY
Bozeman, Montana

March 1991

APPROVAL

of a thesis submitted by

Larry Lowell Stephens

This thesis has been read by each member of the thesis committee and has been found to be satisfactory regarding content, English usage, format, citations, bibliographic style, and consistency, and is ready for submission to the College of Graduate Studies.

2/28/91
Date

Robert A. Felling
Chairperson, Graduate Committee

Approved for the Major Department

3/19/91
Date

Donald Pearson
Head, Major Department

Approved for the College of Graduate Studies

4/9/91
Date

Henry J. Parsons
Graduate Dean

STATEMENT OF PERMISSION TO USE

In presenting this thesis in partial fulfillment of the requirements for a doctoral degree at Montana State University, I agree that the Library shall make it available to borrowers under rules of the Library. I further agree that copying of this thesis is allowable only for scholarly purposes, consistent with "fair use" as prescribed in the U.S. Copyright Law. Requests for extensive copying or reproduction of this thesis should be referred to University Microfilms International, 300 North Zeeb Road, Ann Arbor, Michigan 48106, to whom I have granted "the exclusive right to reproduce and distribute copies of the dissertation in and from microfilm and the right to reproduce and distribute by abstract in any format."

Signature

Larry Lowell Stephens

Date

9/19/91

TABLE OF CONTENTS

	Page
1. INTRODUCTION.	1
Statement of the Problem	5
Significance of the Study	6
Definition of Terms	7
Assumptions	9
Limitations	10
Organization of the Study	10
2. REVIEW OF RELATED LITERATURE	12
Adults as Learners	12
Self-directed Learning	19
Framework for Self-directed Learning	20
Characteristics for Self-directed Learning	23
Attitudes toward Learning	27
Limitations in Existing Research	28
America's Farms	30
Farmers as Learners	31
The Adoption Process	35
Diffusion and Adoption Research	36
Steps in the Adoption Process	38
Adopter Categories	40
Innovative Behavior	41
Characteristics of Innovators	43
Summary	46
3. METHODOLOGY	48
Sample Selection	51
Research Procedures	53
Data Analysis	55

TABLE OF CONTENTS--Continued

	Page
4. FINDINGS	57
Profile of the Sample	58
Design of the Interview	61
Demographics	63
Characteristics of the Sample	63
Production Characteristics	67
Geographic Characteristics	68
Progressive Farmers	70
Learners and Information Sources	74
Initial Contact With New Innovations	74
Actively Pursued Information	75
Need Meeting	77
Incidental Learning	80
Information Sources	83
Interpersonal Communication	86
Observation	112
Reading and Self-study	116
Attending Schools	121
Self-experimentation and Research	127
Information Source Ratings	135
New Technology Adoptions	139
Computers	139
Cellular/Mobile Telephones	146
Learning Outside of Agriculture	149
Travel for Information	153
Obstacles to Learning	155
Preferred Methods for Gaining Information	159
Summary	162
5. CONCLUSIONS AND RECOMMENDATIONS	164
Overview	164
Conclusions and Recommendations	166
Summary	187

TABLE OF CONTENTS--Continued

	Page
REFERENCES CITED.	189
APPENDICES	196
Appendix A--Sample Selection Letter.	197
Appendix B--Progressive Farmer Selection Form	199
Appendix C--Map of Idaho.	201
Appendix D--Interview Form.	203

LIST OF TABLES

Table		Page
1.	Reasons Why People Prefer Self-directed Learning	25
2.	Age Distribution of Respondents	64
3.	Highest Level of Formal Education Attained	67
4.	Production Enterprises	68
5.	County Farm Number and Size Highlights.	69
6.	Rating of Information Sources	136

ABSTRACT

In this world of constant change, some of the most significant changes essential to the survival of mankind have taken place in the area of agriculture. Farming methods, equipment, and plant varieties have become obsolete as new and better alternatives have been developed to increase production and preserve the resources available. These changes in farming practices have important practical implications for farmers.

There is a need for an increase in understanding how farmers go about gaining new skills, knowledge, or promoting change to meet the demands that are placed on him/her, the family, and the farm. The purpose of this study was to explore and describe the learning procedures and sources used by individual progressive farmers who have been involved in this learning process.

The major data gathering technique was recording perceptual observations and comments gained from 50 interviews with selected progressive farmers from 10 counties in southeastern Idaho. These farmers were selected from local farm support groups who worked with the farmers in each of the counties.

The farmers were active information seekers. They were very self-directed in their learning activities and wanted to use the fastest and easiest methods available to gather information and sought applied learning for the immediate situation. Learning strategies varied among farmers with each farmer being involved with a multitude of learning styles and methods. Each farmer used many sources to obtain information and did not seem to be dissuaded by cost or distance. They demonstrated a great deal of creativity in their use and variety of resources and in their participation in self-initiated experimentation and research.

Farmers of today overcome barriers and obstacles to participate in learning and opt for increasing present knowledge, gaining new skills, and promoting change in their lives as well as on their farms. They seek information in all they do and consider learning, keeping current with new technologies, and accepting change as integral factors to their success.

CHAPTER 1

INTRODUCTION

Nearly 400 years ago, colonists came to North America and settled what has become the United States. These settlers cleared the ground and planted crops, and life revolved around the agricultural seasons. Farms gradually prospered and grew. Over time, farming became more sophisticated, and production as well as the land under cultivation increased (National Research Council, 1988).

The way of life differed, of course, from place to place; but for most people, the way of life changed very little from one generation to the next. It was easy for one generation to pass along to the next generation the knowledge that was needed to get along and survive. However, as a result of technological advances and economical forces, this is no longer possible. "Change is now so great and so far reaching that no amount of education during youth can prepare adults to meet the demands that will be made on them" (Cross, 1984, p. 2).

Today, it is becoming increasingly important that farmers, ranchers, and dairymen (hereafter referred to as farmers) be aware of

new developments in research and technological advances in their field or practice and be able to make changes and apply these new techniques correctly. Incompetence and obsolescence are evidenced in many areas of farming.

Technological and economic forces have led to a reduction in the number of farms and to an increase in the average size of those farms. "In the 1930's, there were 6.3 million farms in the United States. Today, about 2.3 million remain" (National Research Council, 1988, p. 52). In the 1930's, farmers made up 30 % of the United States population; in 1985, only 1.1 % of Americans were full time farmers (USDA Economic Research Service, 1985; U.S. Department of Commerce Bureau of the Census and USDA Economic Research Service, 1986, p. 27).

Hill (1982) indicated that the farmer of today is the most efficient producer in the world. Today's farmer can produce 13 times as much as the farmer of 50 years ago (Domestic Policy Association, 1986). However, the farmer of tomorrow will need to be even more efficient in harnessing the wonders and powers of science and advanced technology to produce more with fewer hours of labor. Farms will be transformed by the advancement of mechanization, computers, telecommunications, energy conservation, environment, genetics, chemicals, and plant research.

There have been vast changes in farm equipment and practices, and there are more far reaching changes just around the corner.

Hill (1982) points out that changes will produce farm equipment similar to aircraft with automatic pilots. Mini-computers will allow the farmers to "punch in" the day's activities and let the machine do most of the work. Farmers can look ahead to the day when all work on the farm will be conducted by automatic machinery, controlled by computer programs, and supervised by television scanners atop monitor towers.

The computer, which is being widely used by farmers today, will permit the farmer to monitor nature. In the future, satellite dishes on the farm will receive signals from orbiting satellites that will transmit weather conditions, helping the farmer to reduce weather risks. Space technology will feed information to computers to identify and measure land kind use, assess crops and predict yields, detect plant and animal diseases and insect infestations, and determine the suitability of soil and land for particular crop or animal production.

The farmer of today and tomorrow will be more concerned than ever with the conservation of soil and water. He/she will reduce soil compaction through the use of lighter equipment. Soil erosion will be

reduced by conservation tillage (no-till or minimum tillage), and other advances will allow more efficient use of our land.

There are also new crops and animals ahead for the American farmer. Major work is underway in the areas of gene splicing and genetic research. In the future, there will be plants that are naturally immune to pests and diseases. Farmers will see the introduction of entirely new crops as well as improved crops and animals. The future for farmers is limitless and growing--growing to meet the needs and demands of today and of the future.

While the daily life of the farmer will still center on the fundamental activities of producing, the farmer of tomorrow will have to master many more skills and his/her knowledge base will need to expand to include more than that which is required today. Phillips (1979) commented that education for farmers is necessary and that in the future uneducated farmers will not be able to compete. He indicated that economic pressures require constant knowledge and refreshing of skills and that farmers would have to continue learning through schooling, in the field, or a combination of both in order to remain economically sound. According to the National Research Council (1988):

The role of agriculture education today is more important than ever for the professional in agriculture as well as the

consumer, policymaker, and business person. . . . Even more so than in the past, human skills, creativity, and knowledge will be fundamental to building and sustaining U.S. Agriculture (p. 53).

Statement of the Problem

The farmer of today is involved in the process of lifelong learning. The farmer of today and tomorrow faces repeated adaptations to change and a lifelong effort to keep informed. Adult farmers do overcome barriers and obstacles to participate in learning and opt for increasing present knowledge, gaining new skills, and promoting change in their life as well as on the farm. How does the farmer go about gaining new skills, new knowledge, or promoting change to meet the new demands that are placed on him/her, the family, and the farm? Research conducted in the area of farmer learning techniques has left these questions unanswered; yet, in order for agricultural adult educators to aid the farmer in his/her quest for knowledge, answers to such questions needed to be determined. The purpose of this study was to discover and describe the learning processes and sources used by individual progressive farmers who have consciously or subconsciously been involved in this learning process.

Significance of the Study

The results of this study are useful in a variety of ways. First, the study has explored the available body of information pertaining to the learning process of adult farmers; how they get new information, experiences and skills; and in which learning methods adult farmers participate. This information has been summarized in this study and represents a distinct contribution to the literature on adult learning.

Second, this study has determined where adult farmers get new information, experiences, and performance skills in the learning process with regards to farming applications. This information has been summarized in this study to aid the agriculture adult educator in his efforts to assist the farmer in the learning process.

Third, there has been very little research conducted with learning methods pertaining to adult farmers. The traditional research on learning methods has focused on learning methods among adults, but nothing that isolates the farmer. Many present methods in the traditional formal programs do not seem to fully achieve the desired results (as indicated by the lack of attendance at existing traditional programs) in meeting the reported needs expressed by the farmer.

Farmers are learning, but the methods being used or promoted by agriculture adult educators are not necessarily what is accomplishing the learning. This study has determined which methods the farmer uses in the learning process. This information will help educators do a better job of meeting the needs of farmers and could also be used to help improve those methods and strategies the farmer uses in his/her learning endeavors.

Fourth, this study provides fundamental knowledge of how farmers gain the needed information and skills necessary to remain up-to-date in their farming operation, so that other farmers can take advantage of these methods which have proven effective.

Fifth, there is a need for studies to provide information to contribute to the growing body of research on self-directed learning among adults. This study has provided information that will be helpful in adding to the existing literature on self-directed learning from the perspective of the adult farmer.

Definition of Terms

Adult: A mature man or woman who has taken the responsibility for his/her own decisions and actions.

Adult Education: Since education is the acquiring of new knowledge, skills, and attitudes, adult education can be described as the process by which a mature man or woman (those beyond compulsory school age) takes responsibility to improve himself/herself through education. It does not have to follow a set curriculum, but encompasses nearly all experiences related to learning. This would not be the kind of learning that happens by chance, but rather the learning which is sought after, whether alone, in groups, or institutional settings, to increase skills, knowledge, or sensitiveness.

Adult Learner: Any adult who engages in some type of activity, formal or informal, in the acquisition of knowledge or skill, in an examination of personal attitudes, or in the mastery of behavior (Hiemstra, 1976).

Farmer: A person who earns his/her living in the business of operating a farm, dairy, or ranch. A producer of agriculture goods. In this study, farmers, ranchers and dairymen will hereafter be referred to as farmers.

Farm: A farm consists of all the tracts of land, contiguous or noncontiguous, under the operation of a single individual or under a group of individuals in partnership, who use this land in agricultural production.

Farm Operator: A person who is actively engaged in operating a farm. This person must be responsible for decision making for production and marketing for the farm which he/she operates in addition to supplying all or part of the labor.

Intelligence: The ability to learn or understand from experience, or the ability to acquire and retain knowledge. Intelligence is in constant process of forming and requires continuous effort in observation and a will to learn and readjust to retain (Lindeman, 1926).

Progressive Farmer: For the purpose of this study, a progressive farmer is defined as a full-time farmer who is moving forward, advancing toward perfection, to an improved state of farming. A progressive farmer is one who is successful in farming as determined by monetary value. He/she must continue to show

progress and improvements as evidence that learning is taking place. The progressive farmer must be technically competent, aware of new innovations, and a sound decision maker. He/she must be actively seeking out new and improved methods, varieties and technologies, and capable of implementing new innovations which he/she feels would be beneficial to his operation.

Self-directed Learning: In its broadest sense, self-directed learning describes a process in which individuals take the initiative, with or without the help of others, in diagnosing their learning needs, formulating goals, identifying human and material resources for learning, choosing and implementing appropriate learning strategies, and evaluating learning outcomes (Knowles, 1975).

Assumptions

There are several assumptions regarding the design of this study.

They include the following:

1. Adults are in the process of learning, whether or not they realize it, and the adult farmer living in rural America is no exception.
2. A farmer keeps up-to-date with change through a process of learning.
3. There are more methods for learning than that of the traditional, formal educational approach. (Examples include discussion groups and self-directed learning.)
4. Qualitative research can be descriptive. The data collected is in the form of words or pictures rather than numbers and is as valuable as non-descriptive research.

5. Qualitative researchers are concerned with process rather than simply with outcomes or products.

6. Progressive farmers are more involved in the learning process than non-progressive farmers.

Limitations

1. The validity of this study is dependent upon the proper selection of a sample which will represent the population being studied.

2. In a qualitative research study, the researcher is the key instrument. The research will be based on how the researcher perceives the information before him or her.

3. Because progressive farmers were the only farmers selected, the sample would not necessarily represent all farmers within these counties.

Organization of the Study

This dissertation is organized into five chapters plus references cited and appendices. Chapter 1 presents the introduction, statement of the problem, significance of the study, definition of terms, assumptions, limitations, and the organization of the study.

Chapter 2 contains a review of selected literature which is considered relevant to this study. It is organized in the following manner:

(a) adults as learners; (b) self-directed learning; (c) America's farms; (d) farmers as learners; and (e) the adoption process.

Chapter 3 describes the methodology used in this study, including sample selection, research procedures, and data analysis.

Chapter 4 contains the findings from the study, including an introduction, profile of the sample, design of the interview, demographics, and discussion of the findings.

Chapter 5 summarizes the findings, and states conclusions and recommendations pertinent to the field of adult and agricultural learning.

CHAPTER 2

REVIEW OF RELATED LITERATURE

Learning is lifelong and an ever-changing process. Too often, education is looked at as a terminal action which will end with formal school "despite our lip service to the concept that education is a lifetime process" (Minzey & LeTarte, 1979, p.28).

A knowledge explosion is taking place which is both a cause and a product of constant change. This has further accentuated the need for lifelong learning. Reynolds (1984) suggests that, "successfully meeting the challenge of the knowledge explosion may mean nothing less than the preservation of mankind itself" (p. 19). In the area of sustainable agriculture, this is certainly true. Areas to be covered within this literature review include, (a) adults as learners, (b) self-directed learning, (c) America's farms, (d) farmers as learners, and (e) the adoption process.

Adults as Learners

As Gardner (1968) indicated, the idea that education is something which takes place in a block of time between 6 and 18 (or 22) years of age

is no longer adhered to. It is lifelong. The idea that learning can only occur in a classroom has also been abandoned.

Tough (1971) broadly defined learning as a sustained and highly deliberate effort to learn knowledge or a skill, and he found that 98 % of the adults in his research sample were active learners. It would be myopic indeed to believe that adult learning in agriculture would be any different with regards to involvement in learning.

Learning transactions that are undertaken by adults are multifaceted and very complex. These learning moments occur in every imaginable situation. They are at different levels of importance to the learner and are designed to help the learner toward a variety of cognitive, affective, psychomotor, as well as political ends. Learning is gained through a wide range of formats and methods (Brookfield, 1986).

Adult learning should be perceived as a process that can take place in any setting. Such settings could include families, organizations, work groups, interpersonal relationships, voluntary societies, community groups, and support networks. Often times, learning occurs in places not formally recognized as learning areas. "It will often be the case that the most significant kinds of adult learning that are identified as such by adult

learners themselves occur in settings not formally designed as adult educational ones" (Brookfield, 1986, p.4).

When dealing with learning and learners, one must realize that each person learns differently and each comes from a different background with his own perceptions and set of problems. With an infinite number of problems, there needs to be an infinite number of solutions, and that many resources to accommodate the learner. As Gagne (1971) has observed, every adult's store of prior learning and experiences welds into a distinctive intermediary mechanism through which new experiences and knowledge are filtered. Therefore, one can never predict with certainty how one adult will respond to new ideas, interpretations, skill sets, experiences, or materials being presented (Brookfield, 1986).

Who learns and when, where, and how learning takes place are flexibly determined. Options, choices, and collaboration become major factors affecting learning. Each learner is so unique that it is difficult to generalize any one set of principles that will hold true of everyone. Brookfield (1986) put it this way: "Learning activities and learning styles vary so much with physiology, culture, and personality that generalized statements about the nature of adult learning have very low predictive power" (p. 25). Learners need to attempt to match learning styles to

provide an environment that fits. "Each interested party--parent, (learner), student, teacher--must have the opportunity to make a choice of the kind of education that matches his or her style" (Fantini, 1978, p.6).

Lindeman (1926) also asserts that adults are intelligent and desire to expand their intelligence if given the opportunities and if those opportunities fit their needs.

Brundage & Mackeracker (1980) made an ambitious attempt to identify principles of adult learning. These writers identified 36 learning principles. They came to the conclusions that adults are able to learn throughout their lives and that their past experiences can be of help or hindrance to their learning process. It is, however, through such experiences that individuals construct meanings and values that, in turn, determine how they code new stimuli and information. Adults are strongly motivated to learn in areas relevant to their current developmental tasks, social roles, life crises, and transition periods.

Aslanian & Brickell (1980) investigated formal and informal learning activities of adults and found that life events (both internal changes in self-perceptions and changes in external circumstances) provided reasons for learning and created times when adults are especially receptive to new learning.

One principle conclusion from their research was that adults learn in order to cope with change in their lives. Regardless of demographic characteristics, almost all of the adult learners whom they interviewed alluded to their own changing circumstances as their reasons for learning.

Aslanian & Brickell (1980) concluded that:

Adults never outgrow their need to learn. Change touches the life of every adult, although it touches life at some points more often than at others and it touches some lives more often than others. Whenever change comes, early or late, and to whomever it comes, rich or poor, learning is one way of dealing with it. There are not types of adults, black or white, educated or not, blue collar or white collar, who do not use learning to accommodate the changes in their lives (p. 111).

"Most adult learning begins because of a problem or responsibility or at least a question or puzzle" (Cross, 1984, p.188). Interests, needs, and desires provide the energy which is the key for learning and instruction. "When subject matter interests are tallied, practical how-to-do-it courses rank far above subjects that might be pursued because they satisfy intellectual curiosity" (Cross, 1984, p. 90).

"Survey research almost always shows high interest in learning for immediate use" (Cross, 1984, p. 90). Not many adults are excited about learning just for the sake of learning and storing knowledge for later use,

or about locating answers to questions before they ever have the question. Adults usually will not learn what is not relevant to their stage in life.

What is relevant depends upon the person's particular stage in life from which needs and interests are generated. These needs and interests give rise to an intrinsic motivation to learn (Elias & Merriam, 1980). The authors of one of the initial survey research studies on adult learning, Volunteers for Learning, concluded, "It was quite clear from the results of our study that the major emphasis in adult learning is on the practical rather than the academic; on the applied rather than the theoretical; and on skills rather than on knowledge or information" (Johnstone & Rivera, 1965, p. 263).

This type of relevant learning is also related to Knowles' (1980) assumptions about the characteristics of adult learners. According to Knowles:

As individuals mature . . . their readiness to learn becomes oriented increasingly to the developmental tasks of their social roles; and . . . their time perspective changes from one of postponed application of knowledge to immediacy of application, and accordingly, their orientation toward learning shifts from one of subject centeredness to one of performance centeredness (pp. 44-45).

Hiemstra (1976) has identified three major forces that act unitedly to expand adult awareness of the value of continued learning throughout life. These forces are the onslaught of occupational obsolescence, the pervasive change in lifestyles, and the value system that is a characteristic of the changing American society.

According to Smith (1982), there are four basic characteristics of adult learners which generate certain conditions for learning. These characteristics include an adults special orientation to learning, their experiential base, their particular developmental changes and tasks, and their anxiety regarding learning. Adults learn best when they feel the need to learn and when they have a sense of responsibility for what, why, and how they learn. Adult learners use past experiences as a resource in learning, so the process and content of the learning must bear a perceived and meaningful relationship to their past experiences. Adults will, also, generally learn best in an environment that is non-threatening, is supportive of experimentation, and allows for different learning styles to be used.

Because individuals are so different and each will have distinctive learning needs as well as learning style, it is difficult to dictate one set mode of learning that will fit all adults. Brookfield (1986) summarized

the following principles of adult learning as presented by writers who have studied adult learning.

- Adults learn throughout their lives.
- Adults exhibit diverse learning styles and strategies. Their mental sets, cognitive procedures and information coding are unique to each individual.
- Each adult learns in different ways, at different times, and for different purposes.
- Adults generally like their learning activities to be problem centered or meaningful to their life situations.
- Adults want the learning outcomes to have immediacy of application.
- An adult's past experiences affect their current learning, either as an enhancement or hindrance for learning.
- Self-concept of the learner is linked to the effectiveness of the learning.
- Adults exhibit a tendency toward self-directedness in their learning.

Self-directed Learning

No concept is more central to what adult learning is all about than that of self-directed learning. Brockett (1983) has defined self-directed learning as "activities where primary responsibility for planning, carrying out, and evaluating a learning endeavor is assumed by the individual

learner" (p. 16). Thus, self-directed learning is a learning process of active participation in the pursuit of change (Brockett, Hiemstra, & Penland, 1982).

Self-directed learning is a major goal of androgogy, which Knowles (1970) defined as "the art and science of helping adults learn" (p. 43). Such learning can take place with or without the help of others; however, an androgogy is directed at enabling people to become cognizant that they should be the originators of their thinking and feelings (Mezirow, 1985).

Framework for Self-directed Learning

In Adults as Learners (1981), Cross presented a conditional framework to accommodate knowledge about what is known concerning adult learners, including Knowles' concept of androgogy and his assumptions. She called this framework CAL, or "Characteristics of Adults as Learners" (p. 235), and declared that "some of the assumptions of androgogy can be incorporated into these CAL continua" (p. 238).

Included in these assumptions are "self-concept," "self-directing," "growing reservoir of experience," and "readiness to learn." Cross considered self-concept as aligned with the development stage continuum. Adults at the higher levels of ego, moral, or cognitive development are able to assume increasing responsibility for the direction of their learning

activities because they have reached higher levels of developmental maturity, which means that their self-concept includes a perception of themselves as self-directing adults. This self-concept and self-directedness are both seen by Reynolds (1984) as functions of developmental growth. Likewise, the assumption of readiness, or the readiness to learn, is depicted as motivation for learning those tasks associated with the life cycle. These tasks are placed on a sociocultural continuum which is related to age or societal expectations regarding age-appropriate behaviors (Reynolds, 1984). The whole adult holistic environment, including an ever-increasing reservoir of experiences, affects this readiness to learn and, for many adults, will lead to valuable, crucial, perhaps critical "teachable moments."

The way these teachable moments are transmitted into learning activities and learning experiences is, somewhat, dependent upon the adult learner's readiness for self-directed learning. This readiness for self-directed learning can be described as "the extent to which individuals perceive themselves to possess the characteristics, attitudes, and abilities which are needed for self-direction in learning" (Reynolds, 1984, p. 6). Furthermore, self-directed learning is an important and common form of

learning, either through preference or necessity, and has been well established as a form of a learning activity (Tough, 1971, 1979).

Some reasons and benefits for self-directed learning have been suggested by Knowles (1975). One of the immediate benefits is that there is evidence that people who direct their own learning learn more things and learn them better than "passive" learners. A second reason was that self-directed learning is "more in tune with our natural process of psychological development" (Knowles, 1975, p. 14), and that an important part of maturing is developing the ability to direct ones own life. A third reason suggested by Knowles is that education is placing a greater responsibility on the learners to initiate their own learning. The final reason, which is a long-term benefit that comes from directing ones own learning, has to do with the ability to learn without being taught. Knowles (1975) stated:

. . . . it is tragic that we have not learned how to learn without being taught, and it is probably more important than all of the immediate reasons put together. Alvin Toffler calls this reason "future shock". The simple truth is that we are entering into a strange new world in which rapid change will be the only stable characteristic (p. 15).

Tough has also identified advantages of a more practical nature for choosing a self-directed learning approach. According to Tough (1971), some of these advantages include:

-Self-planned learning does away with the potential difficulty of finding someone or something else to plan the project.

-Self-planning allows the learner flexibility to shift direction to meet changing needs.

-The structure that is often part of traditional educational methods or of those planned by others may be frustrating to persons highly skilled at determining their own learning needs and finding the resources.

-Much pride can come from assuming responsibility for planning ones own learning efforts.

Characteristics for Self-Directed Learning

Many studies in self-directed learning among adults have been conducted by researchers such as Tough, Penland, and Coolican. Tough (1971) advised that we regard the adult's learning efforts as an iceberg, and that the attention of professional adult educators has mostly been focused on the one-fifth of the iceberg--professionally guided learning. "Tough proposes that the massive bulk of the iceberg, up to 80% of an adult's learning efforts, consist chiefly of self-planned learning and is ignored by professionals in the field" (Brookfield, 1984, p. 34).

There is an abundance of research on adult learning and on those who participate in various kinds of learning activities. "We know from over thirty recent research studies that for most adults more learning transpires through self-directed efforts than through agency sponsorship. In fact, the typical adult spends about 500 hours annually in independent learning projects" (Smith, 1982, p. 31).

Field research by Tough and Penland on how adult learning is accomplished also implied that the traditional education is not used as much as one would suspect. Group situations where a designated person such as a teacher is responsible for planning the content, sequence, pacing and other aspects for the group account for only 10% of the learning projects according to Tough's research and only 14% according to Penland's research. On the other side of the spectrum, Tough's data showed 73% and Penland's data 80% of adult learning projects were self-planned (Cross, 1984, pp. 189-190). Though their data differ, the results still show a small proportion of adult learning was directed by educated professionals, while a large proportion of the learning was self-directed.

Penland asked adults why they preferred to learn on their own instead of taking courses. The reasons given are shown in Table 1. It is of significance to note that the first four reasons express positive desires to

control their own learning. McCatty (1973) found that in almost half of all self-planned projects the desire to individualize subject matter was an important element. This suggests that a major advantage of self-directed learning is that it allows freedom to determine what is learned.

Table 1. Reasons Why People Prefer Self-Directed Learning

Category	Most Important (percent)
1. Desire to set my own learning pace	46.8
2. Desire to use my own style of learning	37.4
3. I want to keep the learning strategy flexible and easy to change	31.0
4. Desire to put my own structure on the learning project	27.8
5. I wanted to learn this right away and couldn't wait until a class might start	36.2
6. I didn't know of any class that taught what I wanted to know	29.8
7. I don't like a formal classroom situation with a teacher	14.0
8. Lack of time to engage in a group learning program	17.9
9. Transportation to a class is too hard or expensive	5.3
10. I don't have enough money for a course or a class	5.2

(Penland, 1979)

Cross (1981) commented on Penland's findings by pointing out that there are most likely group differences in the reasons people gave for conducting their own learning projects.

I would predict, for example, that adults of low educational attainment would be somewhat more likely to express negative attitudes toward classes, whereas those who went farther in the formal educational system would reflect more positive attitudes, expressing the desirability of having more control over their learning projects (pp. 192-193).

Tough (1971) found that one of the most important reasons for selecting a certain learning activity was efficiency. In other words, the learner wanted to learn in the fastest, easiest and least expensive way possible, and his or her learning activities were determined with this in mind.

Tough (1971) also found that the majority of adults engage in at least one learning project during the course of a year and that many of these projects are designed and carried out by the individual learner. These as well as other studies support the idea that there is a greater percentage of self-directed learning taking place among adults than most educators had suspected. These studies also show the desire that most adults have to control their own education.

However, Tough (1979) has identified some problems that can hinder one's effectiveness as a self-planned learner. Some of these problems include the lack of awareness of needing help in a learning activity, reluctance or the inability of the learner to locate help, or the difficulties that may arise once a helper has been identified. Some adults may not like to participate in self-directed types of activities and therefore choose alternatives such as traditional learning projects. Brookfield (1986) stated, "There are many individuals who are chronologically adult but who show a marked disinclination to behave in anything approaching a self-directed manner in many areas of their lives"(p. 26).

Attitudes toward Learning

Brookfield (1981) used qualitative research to investigate aspects of long-term learning projects. Through the process of interviewing acknowledged experts in specific fields, where their expertise had been acquired through means other than formal education, he identified several characteristic traits of self-directed learning. Learning was gradual and viewed as on-going in an interminable field. The learners did not feel constrained by the boundaries of traditional subject areas, and success was expressed through acknowledgment of peers. Furthermore, these individuals identified themselves as members of a larger learning

community sharing the same interests, pleasures, concerns and problems; they had the feeling that they belonged to a society or fellowship of learning. Brookfield (1981) concluded that his subjects "used enthusiasts' groups to good educational effect, evolved evaluative criteria for themselves, learned to set their own learning goals, and prompted others to engage in learning" (pp. 26-27).

Limitations in Existing Research

Tough's (1967, 1968, 1979, 1982) research subjects were drawn primarily from the educationally advantaged. Other researchers have followed suit, with the result that most of the individuals surveyed have been from the educationally advantaged. Thus, some have questioned the validity of the research when generalized to all adults. Brookfield (1986) stated it this way:

The great majority of individuals in these samples have attained an educational level well above the average. To assume that the behaviors exhibited by these educationally advantaged adults will be displayed by adults from a range of different class and ethnic backgrounds is, to say the least, highly questionable (p. 51).

This criticism does not invalidate the research; however, it does make the results questionable when applied to the educationally disadvantaged.

Another limitation to self-directed learning research is that self-direction is not always easily specified or defined. Skager (1979) stated: "A self-directed learner is not necessarily an individual learning autonomously, though this may often be the case. Self-directed learners may be equally likely to seek help from others and to work cooperatively" (p. 519). Even (1982) contended that people who exhibit an analytical learning style benefit more from a self-directed emphasis, whereas people who have more of a social orientation are not as likely to succeed with self directed learning methods. Brockett (1982) , however, offered a criticism of this type of reasoning, stating that:

It reduces the tendency toward self-direction into an either/or dichotomy, thus failing to consider the complex factors that often interact to make the case for viewing self-direction as a continuous variable, not an all or nothing construct (p. 24).

A major weakness with using quantitative research to study participation in self-directed learning is value imposition, meaning that if one is not participating in education as defined by the particular study, he or she is classified as not learning. Rockhill (1982) pointed out that this is not true, and goes on to state, "It would seem useful to leave definitions open and focus instead upon the range of activities engaged in in order to

learn any particular thing" (p. 7). Such problems do reveal the complexity that is associated with self-directed learning research.

America's Farms

There are 2.3 million farms in America, and each one is uniquely different. There are very small farms and very large farms, and many farms that fall somewhere in between on the scale. As determined by gross sales, there are about 112,000 large farms in this country. Each of these farmers sells over \$200,000 worth of farm produce each year. They make up fewer than 5% of all farms but they produce almost half of all the farm products of American farmers (Lapinski, 1986).

There are approximately 1.5 million small farms in America where the annual sales are less than \$40,000. They produce about 12% of all farm products. Although the owners of these farms think of themselves as farmers, many do not depend on their farms for a major part of their income (Lapinski, 1986).

Between the large farms and the small farms there are about 520,000 middle-sized farms whose owners make between \$40,000 and \$200,000 a year before expenses. The owners of these farms work the land themselves (Lapinski, 1986).

The profile of the American farms has undergone some interesting turns in the recent past. Farms have increased in size, yet decreased in number, and statistics show that these farms are producing more with fewer acres of land in production. "In 1986, farmers produced 20% more food than in 1976" (Lapinski, 1986, p. 11). According to Smith (1980), one of the reasons farmers are able to produce more food today on less land is the greater knowledge base among farmers and their ability to implement change in their farm practices.

Farmers as Learners

Several recent studies have examined aspects of farmer learning to determine where farmers obtain information and the importance of educational programs in assisting farmers. Authors of these studies include Crawford (1969), Stadlman (1973), Awa and Van Crowder (1977), Smith (1980), Garoutte (1988), Matheson (1989), and Carlson and Guenther (1989). In comparing the findings from these studies, it must be realized that all these studies dealt with different populations and looked for different types of information. Crawford (1969) studied Iowa farm operators under thirty years of age, and Stadlman (1973) did a five-year follow-up study of the same farmers. Awa and Van Crowder (1977)

focused on farmers in upstate New York, while Smith's (1980) research involved young farmers in the mid-west. Garoutte (1988) examined public perception of the extension services in Montana. Matheson's (1989) research dealt with farmers in the Northern Plains and Rocky Mountains involved in sustainable agriculture, and Carlson and Guenther (1989) researched Idaho potato producers. Points of similarity of these studies include that each used surveys and a quantitative design, and each asked the participants to identify their preferred source or vehicle for receiving new information.

From the choices given participants, all but two of the studies selected "farm magazines" as "the most" or "one of the most" important source. Garoutte (1988) found the "Extension Service" as the most important source, and Matheson (1989) found that 75 % of the respondents listed "other farmers" as their most valuable information source. Smith (1980) reported that farm magazines were especially of high value to the higher profit respondents, large acreage partnership operators, well-established farmers, and higher educated individuals, with his respondents subscribing to an average of 4.5 farm periodicals.

A study done by Awa and Van Crowder (1977) uncovered some interesting data on the principle communication channels used by farmers

in upstate New York. They found that of those information sources mentioned by respondents, extension sources and magazines stood out as the dominant messengers of relevant information. However, Awa and Van Crowder further observed that friends and relatives and innovative farmers were the most influential sources when the farmers made farm practice decisions.

According to Carlson and Guenther (1989) who researched Idaho potato producers, the information source with the greatest degree of reliability as evaluated by farmers switching to new farm practices was reported to be other farmers in the area who were using the new practice. Other trusted sources included extension potato specialists and research from agricultural experiment stations. Sources considered nearly as good a guide as those listed above were independent consultants, county agents, processor/ shipper fieldmen, and friends and neighbors. Farm magazines were considered somewhat less reliable as a source even though, as reported earlier, it was chosen by the respondents as the most used source.

The farmers in Matheson's (1989) study were asked if they needed more information. "Ninety per cent of all those surveyed indicated they wanted more information" (p. 8). When asked how they would like this information conveyed, their selection for delivery mechanisms, from most

to least favored, were farm tours, workshops, magazines, research data, books, and hands-on-training. By contrast, Carlson and Guenther (1989) reported the preferred methods for receiving information to be reading and "learn-at-home" materials which were highly preferred by more than half of the respondents. Workshops, professional reports, and individual consultations were also preferred, but not as highly.

As a recommendation from his research, Crawford (1969) called for increased emphasis by agriculture teachers to make farmer adult education programs an integral part of their overall vocational agriculture program. He observed, however, that the surveyed farmers were not very active in educational programs. In fact, two-thirds of this group had never attended any formal educational program since high school. This correlates with one other common item worth noting. Most of the studies indicated that respondents placed a high value on receiving more education/ information, yet most of the studies reported that participation and attendance in education and extension meetings was declining.

Clinics, short courses, and product awareness schools offered by commercial companies appeared to attract the largest attendance of farm operators in Crawford's study. Approximately 80 % of the respondents had attended some form of commercial sponsored program.

The Adoption Process

Much attention has been focused on the diffusion process and the adoption of new technologies. One reason for this interest is that the process of getting a new idea adopted, even when it has many advantages, is often very difficult. Benjamin Franklin (1781) once said, "To get the bad customs of a country changed and new ones, though better, introduced, it is necessary first to remove the prejudices of the people, enlighten their ignorance, and convince them that their interests will be promoted by the proposed changes; and this is not the work of a day" (Rogers, 1983, p. 1).

In many fields, there is a great difference between what is known and what is actually put into practice. Most innovations require a long period, often years, from the time they become available to the time when they become widely adopted.

Rogers (1983) defined diffusion as the process "by which an innovation is communicated through certain channels over time among the members of a social system" (p. 5). He further defined the rate of adoption as "the relative speed with which an innovation is adopted by members of a social system" (p. 23). When the number of individuals adopting a new innovation is plotted on a cumulative frequency basis over

time, the distribution results in an s-shaped curve. In the early stages, few individuals adopt the innovation. Soon, more and more individuals adopt and the diffusion curve begins to climb. The growth rate levels off as fewer individuals remain who have not yet adopted (Rogers, 1983).

Most of the research in this area has tried to determine who the early adaptors are and has been designed from the researchers or technologists point of view; that is, to determine how quickly new ideas can be diffused or how to influence the acceptance of an innovation. One deficiency of this type of study is that the individual adaptor's perceptions of the innovation and his/her personal interests, needs and environment have not been considered.

Diffusion and Adoption Research

Research on the diffusion of innovations started in different independent disciplines. Educational researchers studied the spread of new teaching ideas among individuals within schools while rural sociologists investigated the diffusion of agriculture innovations to farmers.

Although several diffusion studies had been completed during the 1920's and 1930's, this whole area of research gained impetus with the now classical Iowa hybrid-corn study of Gross and Ryan in the 1940's.

Their 1943 investigation of the diffusion of hybrid-seed corn, more than any other study, influenced the methodology, the theoretical framework, and the interpretations of later diffusion research (Rogers, 1983). The study was important because it formed the basis of intensive research for years, initially in agriculture, and then in other areas such as medicine, consumer research, and education.

In the Ryan and Gross (1943) study, farmers were assigned to adopter categories on the basis of when they adopted the new hybrid-seed corn . When they compared later adopters to innovators, they found that the early adopters had larger-sized farms, higher incomes, and more years of formal education. The innovators were also more cosmopolitan. The typical farmer moved rather slowly from awareness-knowledge of the innovation to adoption. The innovation-decision process from first knowledge to the actual adoption decision averaged about nine years for all respondents, a finding that led to the realization that such innovation-decision processes involved much deliberation by most farmers.

The typical farmer first heard of hybrid-seed from a salesman, but neighbors were the most frequent channel leading to persuasion. Salesmen were more important channels for earlier adopters, and neighbors were more important for later adaptors. The farmer-to-farmer exchange of

personal experiences with use of the hybrid-seed seemed to lie at the heart of diffusion (Rogers, 1983).

Ryan and Gross (1943) explained that the adoption of hybrid corn spread through the two Iowa communities as a kind of social snowball. From their study, they concluded that the behavior of one individual in an interacting population affected the behavior of the other members. The demonstrated success and acceptance of some farmers offered a new stimulus to the remaining ones, and they felt that the heart of the diffusion process consisted of interpersonal network exchanges and social modeling among the adopters and those who then would be influenced to do so (Rogers, 1983).

Steps in the Adoption Process

From the Ryan and Gross (1943) study and other investigations that followed, rural sociologists discovered an innovation-decision process in which individuals (or other decision-making units) passed from first knowledge of an innovation to forming an attitude toward the innovation, to a decision to adopt or reject, to implementation of the new idea, and finally to confirmation of this decision. The five main steps in this process are: (a) knowledge, (b) persuasion, (c) decision, (d) implementation, and (e) confirmation (Rogers, 1983, p. 20).

An individual sought information at different levels in the innovation decision process in order to decrease uncertainty about the innovation. At the knowledge stage, an individual obtained information about the technological innovation. He or she wanted to know what the innovation was, how it worked, and its possible advantages. In the persuasion, decision stages, the individual sought evaluation information in order to reduce uncertainties about the innovations expected consequences or outcomes. The decision stage led to a decision to make full use or partial use of the innovation as the best course of action which was available or it led to the rejection stage where the decision not to accept the innovation was solidified.

The degree of uncertainty in all of these steps can be reduced by knowledge. "Information is the difference . . . that affects uncertainty in a situation where a choice exists among a set of alternatives" (Rogers, 1983, p. 35). When considering decision influencing information, researchers found that "most individuals evaluate an innovation, not on the basis of scientific research by experts, but through the subjective evaluations of near-peers who have adopted the innovation" (Rogers, 1983, p. 36). These "near-peers" then serve as innovation model acceptors whose innovations, if successful, tend to be followed by others.

Adopter Categories

Not all individuals in a social system adopt innovations at the same time. Individuals differ and their rate of adopting new innovations vary according to these differences as well as the way they perceive new innovations and how they pertain to their particular needs. According to Rogers (1983), individuals adopt new innovations in a time sequence and they may be classified into adopter categories on the basis of when they first begin using the new idea. These adopter categories have been categorized by Rogers as follows:

(1) Innovators are venturesome. The innovator seems to be obsessed with venturesomeness and the testing of new ideas. He or she plays an important part in the innovation process by "launching" new ideas in the social system. The innovator must also be willing and financially able to accept occasional setbacks when a new idea proves unsuccessful.

(2) Early adopters are respectable. The early adopter is a more integrated part of the local social system than the innovator and, of all the adopter categories, has the greatest degree of opinion leadership in a social system. The early adopter is respected by his or her peers and is the personification of the successful user of new ideas. The part the early adopter plays in the adoption process is to decrease uncertainty about new ideas by adopting them and relaying an evaluation of them to near-peers through an interpersonal network.

(3) Early majority are deliberate. The early majority adopt new ideas just ahead of the average members of a social system. They may deliberate for some time before adopting a new idea and seldom lead, though they will follow with "deliberate willingness." In the diffusion process they provide an important link between the early and the relatively late adopters.

(4) Late majority are skeptical. The late majority adopt new ideas after the average members of a social system and not until most others in their social system have already done so. Innovations are approached cautiously, and most of the uncertainty of a new idea must be removed before the late majority feel safe to adopt. Adoption may be due to economic necessity or increased social pressures.

(5) Laggards are traditional. Laggards are the last to adopt an innovation. Decisions are often based on what was done in the past generations. They are very isolated in social networks and generally associate with others who have similar traditional values. They tend to be suspicious of innovations and change, and when they do finally adopt an innovation, it may already have been replaced by a more recent idea that is being used by the innovators (Rogers, 1983).

Innovative Behavior

Farmers who own larger farms, who enjoy a higher socioeconomic status, and who have more mass communication opportunities are more innovative in adopting new agriculture technologies. Perhaps a farmer's failure to adopt innovations is due more to a lack of opportunities rather than to traditional resistance to change. Farmers with more land, money, and knowledge can obtain quicker and fuller input and information about

an innovation. Since these farmers adopt innovations earlier, they stand to gain more of the benefits of innovations such as "windfall profits" that occur to the innovators (Bordenave, 1976). The question might be asked: Are people innovative because they can afford to be, or can they afford to be because they are innovative?

The majority of farmers who lack resources cannot easily adopt new innovations until the risks are lowered. In summary, Rogers stated, "Individuals who have greater resources usually benefit more from the innovations introduced by development agencies than those individuals who have fewer resources, thus widening the socioeconomic benefit gap" (Rogers, 1983, p. 126). Although there seems to be a correlation between wealth and innovativeness, economics does not offer a full explanation of innovative behavior. For example, although agricultural innovators usually are wealthy, there are many wealthy farmers who are not innovators.

Another suggestion for innovative behavior lies in the idea that one cannot seek an innovation until one knows that it exists, and one will not seek an innovation until he or she recognizes the need. It is argued that one becomes aware of an innovation quite by accident. Individuals tend to expose themselves to ideas that are in accordance with their interests,

needs, or existing attitudes, and these provide the energy which is the key for learning and instruction. Hassinger (1959) argues that individuals will seldom expose themselves to messages about an innovation unless they first feel a need for the innovation, and that even if such individuals are exposed to the innovation, such exposure will have little effect unless the individual perceives the innovation as relevant to his needs. An example is the farmer who drives past one hundred miles of hybrid corn and never "sees" the innovation.

Characteristics of Innovators

From previous research related to innovativeness, several generalized characteristics of innovators have emerged. Rogers summarized some of these characteristics as follows:

- (1) Earlier adopters are not different from later adopters in age.
- (2) Earlier adopters have more years of education than later adopters have.
- (3) Earlier adopters are more likely to be literate than are later adopters.
- (4) Earlier adopters have a higher social status than later adopters.
- (5) Earlier adopters have a greater degree of upward social mobility than later adopters.

- (6) Earlier adopters have larger-sized units (farms, companies, and so on) than later adopters.
- (7) Earlier adopters have more specialized operations than later adopters.
- (8) Earlier adopters have a greater ability to deal with abstractions than later adopters.
- (9) Earlier adopters have a more favorable attitude toward change than later adopters.
- (10) Earlier adopters are more able to cope with uncertainty and risk than later adopters.
- (11) Earlier adopters have a more favorable attitude toward education than later adopters.
- (12) Earlier adopters are less fatalistic than later adopters.
- (13) Earlier adopters have higher levels of achievement motivation than later adopters.
- (14) Earlier adopters have higher aspirations (for education, occupations, and so on) than later adopters.
- (15) Earlier adopters have more social participation than later adopters.
- (16) Earlier adopters are more highly interconnected in the social system than later adopters.
- (17) Earlier adopters are more cosmopolite than later adopters.
- (18) Earlier adopters have more change agent contact than later adopters.
- (19) Earlier adopters have greater exposure to mass media communication channels than later adopters.

(20) Earlier adopters have greater exposure to interpersonal communication channels than later adopters.

(21) Earlier adopters seek information about innovations more actively than later adopters.

(22) Earlier adopters have greater knowledge of innovations than later adopters.

(23) Earlier adopters are more likely to belong to highly interconnected systems than are later adopters (Rogers, 1983, pp. 251-252, 257-259).

From diffusion research, a set of generalized characteristics for each adopter category (innovators, early adopters, early majority, late majority, and laggards) has emerged. The differences in these categories would suggest that for change to take place, different approaches should be used with each adopter category and that one of the chief uses for this type of research is to provide a basis for audience segmentation strategies for diffusion agencies (Rogers, 1983). Of course, as in all generalized statements, there is danger in placing too much credence on the rigidity of the breakdown of the categories. Overlaps exist between categories and there are exceptions to characterizations within categories.

Summary

Learning is taking place all of the time and in many different places. Adults are constantly receiving information and processing it through past experiences and knowledge. Often, learning occurs in places not formally recognized as learning areas. Adults desire to expand their knowledge base if given the opportunity, provided the opportunity fits their needs.

There is need to contribute more information to the growing body of research on self-directed learning, especially when it comes to the self-directed learning among farmers. Research studies show that more adult learning transpires through self-directed efforts than through agency sponsorship, but is this true also of the American farmer? Research in the area of farmer learning indicates that current traditional programs offered to the farmer do not seem to fully achieve the desired results, as indicated by the decreasing participation in these programs, even though most farmers reportedly placed a high value on receiving more information.

There are approximately 2.3 million farms in America. These farms are increasing in size and are decreasing in number. Among these farms and the farmers that operate them, changes are taking place that have important practical implications for farm operators. Becoming

aware of these changes and gaining the necessary knowledge to evaluate new technologies comes from a variety of sources. Research in the innovation diffusion area has uncovered much that helps us better understand the adoption of new innovations and the continuing need for adult learning. In many fields, there is a great difference between what is known and what is actually put into practice.

In the review of the literature, there seems to be little information available to help farmers learn how other farmers gain information pertaining to new technologies and skills necessary for them to remain up-to-date in their farming operations. Farmers need to have this information available to them so that they can take advantage of the methods other farmers have used which have proven effective.

CHAPTER 3

METHODOLOGY

The review of the literature makes it obvious that farmers are involved in learning and in change. It also suggests that there is a great deal of learning taking place among adults, and that for the adult farmer living in rural America this is no exception.

Much research has been done in the area of what adults want to learn and in what programs they participate. "Judging by the number of journal articles, dissertations, and studies devoted to it, the topic of participation in adult learning is probably the most enduring research concern since investigation of this field began"(Brookfield, 1986). There will, undoubtedly, be much more research in this area which will promote the further understanding of the adult learning process. However, when it comes to how rural Americans, more precisely the American farmers, participate in learning, how they learn, what they learn, what styles they use, and how increased learning affects their change process, little research had been done.

Smith (1980) points out that farmers are learning, but the problem is that adult educators do not know how learning is taking place among the farmers (that is, methods, styles, strategies), and in spite of the amount of effort being made in agriculture education, only a small percentage of farmers participate and are being reached and helped.

The main purpose of this research was to describe the learning process used by individual farmers who have consciously or sub-consciously been involved in the learning process. The research design method used for this study was a naturalistic approach. The major reason for choosing this type of design was the need to uncover and discover information concerning learning among farmers.

A rationalistic study could have been designed if the types of styles and strategies of learning being used by the farmer were known. For example, a quantitative study would be very effective in determining how a farmer who uses a computer in his farming operation learned to use that computer, that is, classes, computer store assistance, other individuals, self-study, or other means. However, what was needed to answer the research question was not a comparison, focused on the systematic, objective, and quantitative measurement of variables and their relationships, but rather, the 'hows' and 'whys' of adult farmer learning.

When dealing with learning and learners, it is essential to realize that each farmer is different and each comes from a different background. A naturalistic approach allowed for consideration of individual differences among farmers in their own environment and enabled the researcher to better understand how the farmers perceived learning.

A naturalistic approach is a science of discovery. It is an inductive approach to research that focuses on social interaction and relies heavily on data from interviews and observations to build theory grounded in the data rather than to test theory as rationalistic inquiry does (Bogden & Biklen, 1982; Dobbert, 1982; & Guba & Lincoln, 1981). For example, when the purpose of an investigation is to investigate an area where it is important to look at feelings, thoughts, values, perceptions, or actions, description is necessary and a naturalistic study is called for.

In order to obtain the desired types of data, the major data gathering technique in this study was the recording of the interviewer's perceptual observation gained from conducting interviews. A selected sampling of the population of progressive farmers within a selected area was personally interviewed. Progressive farmers were selected based on the assumption that progressive farmers are more involved in the learning process than non-progressive farmers.

Sample Selection

In this study, the major data was gained from conducting interviews within a 10 county area of Southeast Idaho. These counties consisted of Fremont, Madison, Teton, Jefferson, Bonneville, Bingham, Power, Bannock, Cassia, and Butte. All of these counties have an agricultural base with agriculture being the largest industry (Bureau of the Census, 1987) and thus were an appropriate representation of a much larger population. Also, limiting the area of the research to these ten counties which are all located within a 100 mile radius of the home base of the researcher allowed time for repeated visits to the farmers.

The sample of the farmers asked to participate in this study were selected from a population of farmers which met the following criteria:

1. The farmers selected were adults between the ages of 25 and 70 years of age and had been actively involved in farming for the preceding 5 years. Farmers within these bounds were most likely to look at farming as their future occupation or had been involved in farming long enough to recognize learning procedures which work for them.
2. The farmers selected were full-time farmers. Part-time farmers could very well be engaged in learning; however, the motivation

for learning and the methods of learning might differ from those of full-time farmers whose livelihood depends upon their success in farming.

3. Farmers selected were all farming 500 or more acres. Those farmers farming less than 500 acres probably would not have given a true representation of the progressive farmer within these 10 counties.

4. Farmers selected were all determined to be progressive farmers by the sample selection corps.

The researcher realized that such a determination of progressive farmers is a value judgment. In order not to bias or skew the research sample, these value judgments were made by other individuals involved in assisting farmers. These assist groups included, but were not limited to the following: fertilizer dealers; pesticide and herbicide applicators; irrigation companies; soil and water conservation services; extension agents; seed and feed suppliers; fuel suppliers; farm equipment dealers; farm organizations; financial institutions; agricultural educators; grower organizations; livestock associations; and other farmers.

To select the population from which the sample was taken, the researcher contacted individuals from these and similar farmer support groups within each county. After identifying the criteria for the selection of selected farmers, these individuals were asked to identify, in their

opinion, the five most progressive farmers in their county (See Appendix A--Sample Selection Letter and Appendix B--Progressive Farmer Selection Form). The names of the five individuals who appeared most often on the lists from the support groups from each county were the individuals selected for the sample. Each farmer had to be selected a minimum of three times in order to become part of the sample. However, all participation was on a voluntary basis. If a selected farmer was not willing to participate, another was selected from the county represented.

In this study, the sample size was 50 farmers. This number was estimated as adequate to generate enough information to answer the major questions asked in the study.

Research Procedures

The progress of a naturalistic study is guided by findings as they emerge. It is, therefore, important not to become rigid in a prestudy plan but to be prepared to modify expectations or change design in order not to spend too much time searching for the "right study" when it might not exist (Bogdan & Biklen, 1982).

After the selection process, each of the progressive farmers in the sample was contacted by telephone. The research project was explained, as

well as how their name had been selected. Their participation was requested and an interview appointment at their farm or office was set.

Interviews in this study were organized in the following manner. At the interview meeting, the interviewer briefed the respondent as to the purpose of the interview and attempted to set the farmer at ease. The interviewer explained the manner in which responses were to be recorded, and permission from the respondent was obtained. The interviews were recorded on a mini tape recorder and fieldnotes and pictures were taken for later analysis. A copy of the interview summary was sent to each farmer who requested it for verification and clarification.

Sample questions for the interview are included in Appendix D-- Interview Form. However, broad and open-ended questions were asked, leading to discovery. The interviewer then led the discussion in a direction determined by the respondent's answers.

The major objective of the questions asked during the interview process were to gain answers to the following research questions:

- (1) Where do progressive farmers first receive information regarding new methods or innovations?
- (2) What sources are used most by progressive farmers to obtain information about new innovations or methods?

(3) What information source is most relevant to the progressive farmer's needs?

(4) What methods are most often used by progressive farmers in the learning process?

(5) What are the preferred methods for progressive farmers to gain information?

Data Analysis

Data analysis is the process of systematically searching the information gathered. Analysis involves working with this data, organizing it, breaking it into manageable units, synthesizing it, searching for patterns of variance or of central tendency, discovering those things that are important that are there to be found.

Although it is possible to collect data and to conduct all the analysis later, for this study the data was collected, organized, and analyzed simultaneously from the beginning. This process of jointly collecting, coding, and analyzing information led to the discovery of patterns and their meanings. These patterns and meanings formed the basis for generalizations which were then further tested through continued observation and questioning. This process also led to decisions regarding

what data to collect next in order to develop theory as it emerged (Glaser & Strauss, 1967). "Effective evaluations provide opportunities to improve. In order to be effective, evaluation designs must properly reflect the nature of the enterprise being evaluated and the overall purpose for which the evaluation was initiated" (Fellenz & Conti, 1984, p. 1).

Material was sorted so that information bearing on a given topic could be physically separated from other data. This material was organized so that it was able to be retrieved and read. This was done by a coding and scoring process through the use of a Macintosh SE computer and took place as soon as possible after each interview. From the fieldwork interviews and the information acquired from the sorted data, the importance of the items found in the analysis was decided and the important outcomes of this study were determined.

CHAPTER 4

FINDINGS

The purpose of this study was to investigate how progressive farmers of today overcome barriers and obstacles to participate in learning and opt for increasing present knowledge, gaining new skills, and promoting changes demonstrated in part by the adoption of new techniques.

This chapter presents and discusses the results of an analysis of the data that was obtained from interviewing 50 selected progressive farmers that comprised the study sample. Previous research conducted in the area of progressive farmer learning has left several questions unanswered. Since learning is an individual process and no two individuals are alike, a naturalistic evaluation design was selected in order to generate data which was not of a comparative nature but rather demonstrated the "hows" and "whys" of farmer learning. A naturalistic approach allows for individual differences among farmers in their own environment, is neither based on any preconceived ideas from the researcher nor allows previous research to bias results, and enables the researcher to better understand how the farmers perceive learning and how learning actually takes place.

Profile of the Sample

The research sample consisted of 50 progressive farmers selected from 10 counties in Southeastern Idaho. These counties were Fremont, Madison, Teton, Jefferson, Bonneville, Bingham, Power, Bannock, Cassia, and Butte (for better identification, see Appendix C--Map of Idaho). The sample was selected from a population of farmers which met the criteria.

In selecting the sample, assistance was obtained from various farm support groups including, but not limited to, fertilizer dealers, pesticide and herbicide applicators, irrigation companies, soil and water conservation services, extension agents, seed and feed suppliers, fuel suppliers, farm equipment dealers, farm organizations, financial institutions, agriculture educators, livestock associations, as well as other farmers. In contacting individuals representing these support groups, the purpose and nature of the research project was explained, as well as the desired outcomes and benefits. The method of sample selection was explained to them; that is, that individuals like themselves would recommend 5 farmers who met the criteria of the study and who they felt were the most progressive farmers within their county. These five names would then be combined with all the other names obtained from the other contributors

within the county, and the farmers who were selected most often, with at least three repetitions, would become the sample.

In some counties the sample emerged rather quickly, whereas in other counties as many as 21 support groups and individuals had to be contacted before 5 names repeated at least 3 times. This is illustrated by the fact that in one county, the 5 names for the sample emerged from a list that included only 14 different farmers while in another county the list included 63 names before 5 individuals qualified for the sample. At the same time, some farmers were selected as many as 14 times before the rest of the sample emerged.

During the selection process, most contributors from the various support groups were very gracious and willing to help. Many expressed an interest in the results of the study. The only exception was the spokesperson from a group who felt the request was an infringement upon the confidence that the farmers placed in him and who declined to take part.

In contacting these selected progressive farmers, telephone calls were made to initiate the contact. During the telephone call, an explanation of the research was given as well as an explanation of how they had been selected to participate in this study. Their cooperation was solicited and

an appointment for an interview at their convenience was set up. Any questions they had were answered at this time and they were given an explanation of what would be expected of them and an approximation of the time involved.

Without exception, all farmers contacted graciously agreed to participate in the study. Seven of the 50 farmers asked that they be contacted at a later date to set up an interview appointment, but the remainder set up appointments within the next few days. Most seemed excited to participate in the research; however, some were apprehensive about what was expected. In spite of their busy schedules, all made an effort to cooperate. Comments from the farmers such as the following demonstrated their commitment and cooperation.

I have an appointment at 9:00 which should be over by 10:00 and another appointment at 1:00. Could we conclude our business sometime between those two appointments? (58 yr. old potato grower)

I'm leaving town tomorrow for meetings in another state. I'll be out of town until next week. If you can call me back next Monday, I'll be glad to set up a time to see you then. (64 yr. old potato and grain farmer)

Oh, you flatter me. . . . I'll be back at the house tomorrow afternoon at 2:00. You can visit with me then. (54 yr. old dairyman and potato grower)

Well, we've worked really hard at being good at what we're doing. . . . I'm busy today, but if you can come by at 7:00 in the morning, I can meet with you then. (41 yr. old potato seed grower)

Oh, you don't really want to interview me. There're a lot better farmers than I am. . . . If you want to come up on Thursday at 3:00 we can talk, and I'll show you my new shop I'm building. (28 yr. old barley producer)

Well, if you want to come out right now I've got some time and I could meet with you. (54 yr. old diversified farmer)

Most of the interviews were conducted at the farmer's office, shops, home, or a combination of the above. All of the interviewed farmers seemed proud of their farms and their operations and were most anxious to display their setup.

Design of the Interview

Of primary importance to the interviewer was setting a courteous and comfortable environment in which the respondent felt free to respond. The interviewer made a point of arriving at each interview 5-10 minutes early so as not to keep the farmer waiting and to let him know that his time and the interview were of value.

The farmer was again briefed as to the purpose of the interview, how he had been selected for the study, how the responses would be recorded,

how they would be used, and the value of the study and permission to use the recorded responses was obtained. Appreciation was expressed for the farmer's time and cooperation, and an attempt was made to make the farmer feel at ease. All of the interviews except one were recorded on a mini tape recorder. One farmer requested not to have the interview recorded and this request was honored. On some farms, pictures were taken of special techniques, technologies, or other interesting things for later recall and use. Field notes were taken during all interviews and additional observations were recorded following the interviews.

Sample questions for the interview are included in Appendix D-- Interview Form. The interview generally began with demographic type questions which led into an open-ended discussion. Each interview was unique, following a line of questioning which seemed to best fit the farmer's style and interests. However, each interview focused on answering the following questions:

- (1) Where do progressive farmers first receive information regarding new methods or innovations?
- (2) What sources are used most by progressive farmers to obtain information about new innovations or methods?

(3) What information source is most relevant to the progressive farmers needs?

(4) What methods are most often used by progressive farmers in the learning process?

(5) What are the preferred methods for progressive farmers to gain information?

The researcher concentrated on probing for understanding, and many comments led to revealing ideas which were followed up with more questions or further investigation. Therefore, not all questions on the interview form were as extensively pursued with each interviewee, and some questions were not even discussed in some interviews. The form was used strictly as a guide.

Demographics

Characteristics of the Sample

This study comprised on-site visits to 50 progressive farmers in Southeastern Idaho. Of these, all 50 were male. Forty-seven of the farmers were Anglo-American; and the other 3 were Asian-Americans. Ages of the respondents varied from 27 years of age to 69 years of age. Table 2 reveals the breakdown of the ages of the respondents. It is of

significance to note that 7 of the farmers were 35 years of age or younger and had been selected as progressive even though they had not been in the farming industry for many years. The mean age of the interviewed farmers was 47.3 years of age; the average age of U.S. farmers, overall, is 50 years of age (Matheson, 1989).

Table 2. Age Distribution of Respondents (N=50)

Age	Number	Percentage
25-35	7	14
36-45	13	26
46-55	17	34
56-65	10	20
66-70	3	6

The background of the farmers also varied. Nineteen of those interviewed had grown up on farms and had returned to those same farms. This was due to joint family businesses, buying out family farms, or inheritance. Sixteen of the interviewed farmers had grown up on farms other than the ones they were currently farming and had purchased their present farms. The other 15 farmers had grown up with a non-farming background but had chosen to enter the farming profession. Only 38% of the farmers moved into an established family farming business while 62%

of the farmers started their own farming business and initiated the acquisition of their farms.

Each farmer was asked if he were satisfied with his profession, if he enjoyed it, and if he would pursue farming as a career if he had the choice to make again. Without exception, all of the farmers were satisfied and thought that farming would again be their choice of career. Although their expressions and feelings cannot be transmitted with the quotations, all quotations are transcribed as accurately and clearly as possible from the interviews.

As I was growing up, my dad was a chiropractor. I always wanted to be a farmer. After graduating from high school, I arranged to buy 30 acres. I was able to time share with other farmers in order to use their equipment after work. Even though it was hard, I love farming and I'd do it over again. (54 year old farmer, 3200 acres)

It took me several years to get into farming. I first had to make enough money to buy me a farm. But, I've always wanted to farm, and if I had it to do over again, I would do it again. I love it. (54 year old farmer, 6600 acres)

I was raised on a farm and I've always wanted to be a farmer. As soon as I saved enough money from selling farm machinery, I bought a farm, and if I had it to do over again, I suppose I'd do the same thing. I really enjoy it, even though at times I wonder why in the . . . I'm doing it. (61 year old farmer, 1400 acres)

If I had it to do over again, I would definitely go back into farming. I love it. However, I didn't start out as a farmer, and I didn't come from a farm. I taught school for several years first. I really enjoyed teaching school, too. They just didn't pay enough. (46 year old farmer, 7000 acres)

I wanted to be a vet, but when my father passed away, I started working on the farm and I've continued working here. I love the farm and have no regrets, I'm proud of the profession. (40 year old farmer, 7200 acres)

I was a Rhodes Scholar candidate, but I turned it down to come back to the family farm. From the time I was old enough to work, I've always wanted to be a farmer. (54 year old farmer, 5000 acres)

All of the farmers interviewed had at least a high school degree.

Table 3 data shows the number of years of formal education beyond high school received by the farmers within the sample. This averaged 3.03 years of formal, post-high school education. Of this group, 13 individuals had received 2 year associate of arts and science, vocational, or technical degrees; 14 individuals received a 4 year bachelors degree; 4 of the farmers had received masters degrees; and 2 of the farmers had received their doctorate.

Table 3. Highest Level of Formal Education Attained (N=50)

Education	Number	Percent
High School Graduate	4	8
1 Year Post High School	3	6
2 Years Post High School	19	38
3 Years Post High School	5	10
College Graduate	14	28
1 Year Post Graduate	1	2
Masters Degree	4	8
Doctorate Degree	2	4

When comparing the educational attainment of the farmers in this study with the farmers who responded to a study conducted by Carlson & Guenther among Idaho potato growers, it was found that the farmers in this study had received a slightly higher traditional school background. Carlson & Guenther (1989) report, "The median education was 'some college.' Twenty-one percent were college graduates and 4 percent had advanced degrees" (p. 474).

Production Characteristics

Types of farming production varied greatly, and all of the progressive farmers interviewed were diversified in that all were involved in two or more production enterprises. These farmers were involved in a total of 15 different production enterprises, with the average

number of enterprises being 3.98 per farmer. The data in Table 4 gives a breakdown of each production activity represented and the total number of farmers involved within the sample.

Table 4. Production Enterprises

Production Enterprises	Number of Farmers Producing	% of Total Farmers Producing Product
Barley	44	88
Potatoes	41	82
Wheat	36	72
Alfalfa	27	54
Beef Cattle	20	40
Peas	6	12
Sugar Beets	5	10
Dairy Cattle	4	8
Oats	4	8
Sheep	3	6
Horses	2	4
Safflower	2	4
Rape (Canola)	1	2
Beans	1	2

Geographic Characteristics

Over the past few years, the size of farms in Idaho has been increasing. According to the agricultural census published in 1989, the average farm size in 1987 increased to 577 acres. The total number of farms in the state was reported at 24,142. The number of farms in the

state that correlates more closely to the sample criteria, that is, with 500 or more acres, was reported to be 5452. An analysis of the sample of progressive farmers shows that the largest farm under operation was 40,827 acres, while the smallest farm under operation was reported to be 590 acres. Table 5 lists additional information about the size of farms in those 10 counties from which the sample was drawn, and information about the size of farms of the sample.

Table 5. County Farm Number and Size Highlights

Counties	Farms in 1987*	Farms over 500 acres in 1987*	Average farm size with sales over \$10,000*	Average farm size within sample
Bannock	655	138	1074	2954
Bingham	1466	324	1461	3467
Bonneville	905	200	895	3843
Butte	224	83	983	2174
Cassia	909	103	969	4426
Fremont	546	169	833	3380
Jefferson	823	151	628	4483
Madison	510	130	736	2508
Power	350	183	1654	11238
Teton	268	96	769	3834

*(Information from 1987 Census of Agriculture, 1989)

The total acreage under production by all of the farmers within the sample was 211,550 acres, with the average farm size being 4231 acres.

A comparison within Table 5, indicates that this is well above the average farm size within those counties. From this statistical information, it is evident that the farmers selected for the sample were not average farmers but fit in the higher socio-economic portion of the farm community.

Progressive Farmers

According to the data gathered through onsite interviews, farmers differ as do the farms they operate. They have different problems, different needs, different circumstances, and different challenges. Yet, they are similar in that they love to farm, work hard at doing things better, and are actively seeking information all of the time.

Each farmer had his own individual personality. There were optimists and pessimists, excitable and placid personalities, exaggerators and cautious reporters, and modest and self-important individuals.

Because each of the farmers was unique, each was faced with a multitude of different problems for which there needed to be many solutions and many resources to accommodate the learner. The following comments from the interviews demonstrate the farmers' awareness of this.

Things are different among farmers and on different farms. Not all things that work for one will work for another, and it's interesting that even right here in a small area the same thing applies. (41 year old hay, grain and potato farmer)

The system we use is, I believe, unique to us. I don't know of anybody else who is doing it quite like we are. (53 year old grain, hay and potato farmer)

I feel that I'm a unique farmer in the way that I am creative. A lot of farmers aren't creative. The more creative a person is, the easier it is for them to excel in whatever they're doing. (57 year old potato, hay and grain farmer and cattleman)

We learn a lot from other farmers. They're all so different and do things different than we do, and we talk to them a lot and go see them and see what they're doing. We try to travel and see several farmers throughout the year, but what works for a farmer [somewhere else] doesn't necessarily work for us here. (61 year old potato and grain farmer)

I would say that we're different from other farmers in that our farm is different, we are different, and the information we have at our fingertips is different. And, probably, our farming goals are different. You would think that all of our farms are the same, but it's just like your children. They are all different. You need to learn what works best with them and you need to learn what works best for your farm. (31 year old potato, grain and alfalfa farmer and cattleman)

In spite of these differences and though the questions were answered in different ways, similar themes and ideas kept surfacing as the interviews progressed.

Each farmer seemed to be aware of and to emphasize that he was constantly learning, that it takes a continued effort to keep up-to-date, and that learning is gained through a wide range of formats and methods. They seemed to seek out information in all that they did, and they considered learning and keeping up-to-date an integral factor to their success. However, this learning did not often come through traditional educational facilities but rather through non-traditional learning activities. In the statements that follow, these farmers speak for themselves.

I consider knowledge and the gaining of new information and knowing how to gain that information as one of the keys to my success. I consider myself as one of the first in a lot of the things we do, and because we are one of the first, we take advantage of that in helping the farm to be profitable.
(Registered Hereford producer)

You need to listen to the world experts. Find out who they are and listen to what they have to say. (Potato seed grower)

A farmer has to get involved in agriculture. And not just here on the farm. You have to be out talking with people and finding out what works for them, bringing it back, breaking it all down, and making it work here. (Potato grower)

Every little bit of the day, we pick up information on running our operation. Whether it be from the fertilizer dealer, the radio, extension, we use everything. There's not just one major source of information. There isn't any one source that I couldn't do without because I know I could get the

information from other sources, but I do actually use them all. (Potato and barley grower)

No matter how much you know and how much schooling you have, you still need to learn and broaden your horizons, or the world will just pass you by. (Potato and grain grower)

To get valuable information that can help you, you just have to keep working at it. It can come from anywhere and at anytime. You just have to keep an open mind and keep working and thinking. (Potato seed grower)

I consider myself to be a person who seeks out information, is constantly learning and picking up information as it pertains to my farming operation as well as other aspects of my life. (Diversified farmer)

I learn all the time. Everything I do is geared, I suppose, to learning, to becoming better, more efficient at business, to understanding. (Potato and grain grower)

You're always looking at everybody and everything as a possible source of information. You can learn from everyone you meet. However, you want to surround yourself with key people who make a positive influence on you and who provide you with valuable information that will help you learn and make the right kinds of decisions. I have hired a man whose job it is to get information for me. His job is to read all the magazines and journals, attend all the schools, visit other farmers and companies and attend company schools. When he hears of a new idea, he's the one who travels to find out about it. Then he reports back to us and summarizes what he has found out and makes recommendations. (Potatoes, grain, and forage grower)

Being new to farming, I consider that in order for me to stay in business, I have to be learning all the time. There are things that I have to learn to continue to run the farm. (Potato and grain grower)

I find myself always seeking out information. I find myself looking for information all the time. It does not just come. I'm always looking for the keys that unlock the doors to increased quality and production. (Potato, sugar beet, and wheat grower)

You need to be searching all the time for possible ways and sources for information. Learning is the key to the future. That is, if you want to stay in farming. (Alfalfa, grain, and potato grower)

Being a farmer is like being Luke Skywalker, walking into the Starwars bar and he sees all those different kinds of circumstances and he has to deal with those circumstances in a positive manner. Agriculture is like that. It is very exciting. It's more than driving a tractor. It's getting information from all over the world. (Diversified farmer)

Learners and Information Sources

Initial Contact With New Innovations

Although most of the discussion during the interviews with the farmers was centered on information sources, learning methods, and new innovations, the initial contact with new technology was also discussed. In responding to questions such as, "Where did you first hear about some new idea, new innovation, new practice? Where do you get that kind of information?", these farmers reported that information on new ideas fit into one of three different categories described below.

Actively Pursued Information. One way that the farmers came in contact with innovations was through their active pursuit of information. They put themselves in positions where they would hear about new things. They did this through activities such as reading magazines, attending different schools, talking and working with professionals and other farmers, and serving on board of directors for grower and other organizations. They were constantly on the lookout for new ideas that might work for them. This was quite consistent among all the farmers.

The motive for this active pursuit of information was generally to improve what they were doing. They had a desire to become the best at what they are doing, and tended to be motivated to learn about things which they valued. These farmers seemed to feel it of real importance to keep informed and to know that there was nothing out there that they did not know about. In general, a sense of confidence occurred when the farmer felt personal mastery of what he was about and felt that he was on top of his practice. Some of the farmers' comments demonstrating this follow.

One of the reasons we like to work with the chemical companies and help them with their experimentations is because it keeps us right on the forefront of progress so that we can take advantage of those new things that are just breaking in the industry. (4500 acre farmer)

I've been associated with the North American Potato Seed Institute for four years and they have a yearly national convention. I've been on the program committee, and from this I get to read all of the research presentations for potatoes (private as well as from universities) to find out which ones we want to fund. From this, I get a lot of valuable ideas. There has been a world of progress in the last seven or eight years, and I get all of that information firsthand, before it's even presented in any of the meetings. (2000 acre farmer)

I'm one of the directors of the Idaho Crop Improvement Association, for which I travel all over the state. By meeting with the different members of the association all over the state and discussing crop improvement, I learn an awful lot. It's a great source of information for me in running my own farm. Even though this association is a service type of organization, it is very valuable to me. (5500 acre farmer)

Just when I think I know what I'm doing, then I see something from another farmer that completely blows me away. This makes me realize that I need to continue to learn what there is to learn out there. (1400 acre farmer)

I like to talk to different dealers because they're a good first source to find out what's going on in the area because they have contact with so many people. But once you find out about that new happening, you need to investigate it further. (1300 acre farmer)

The farmer network is about as good a communication network as there is. The farmers are pretty innovative and competitive, so a lot of it [innovative ideas] is just farmers. It's a lot of word of mouth. (8500 acre farmer)

We have at least 12 different magazines coming to our place, and we read them and they are very helpful in giving us information and new ideas. You can learn a lot from magazines. (4500 acre farmer)

We get our new information everywhere. We go to potato schools every year. We work very closely with fertilizer dealers; we work with the county agent, other farmers. We are active in various production organizations, and we travel a lot so we get to see operations in other areas besides just right around here. We pick up ideas in other areas that we bring back here. (2450 acre farmer)

Need Meeting. Another category for getting new ideas grew out of problems or needs. Whether concerning the farm or off-farm activities, these farmers set out to find ways to solve their problems or personal needs. While this was also a type of actively pursued learning, it is categorized differently because the learning was sought with a specific purpose in mind. It was a more focused type of inquiry than the actively pursued information. A 57 year old dairyman who milked 750 cows daily made the following comment.

Needs and priorities are always changing. Most of my deliberate information seeking is to cure some problem that I'm thinking about. I look at things a lot differently as things change. An example of this is when a piece of equipment breaks down and you have to do the work by hand. A lot of learning takes place trying to get the problem solved.

Needs that motivated learning occurred in the form of an item to be used to change or improve a function or in a way of reaching a goal which the farmer had set. Interests, needs, and desires provide the energy

which was the key for learning and instruction. These needs were like strong internal feelings that seemed to push the farmer toward the satisfying of those needs or goals. The more strongly the farmer felt the need, the greater the pressure and desire to satisfy that need. When the necessary learning had taken place to satisfy those needs and desires, many farmers then seemed to move on to satisfy other needs and desires. The idea that "these needs and interests give rise to an intrinsic motivation to learn" (Elias & Merrian, 1980, p. 133) was demonstrated many times by the farmers. All farmers reported that they learned new things to triumph over problems.

Most learning has to have a need first before the solution makes much sense. A lot of new things, I let go of, simply because I'm so busy and it's not one of those things that seems of great necessity to me. (31 year old, 4300 acre farmer)

All new ideas you recognize because you have a need for that idea. If I did not need to save the soil and to save money, there's no way that you could have talked me into buying a no-till drill. There are probably a lot of good ideas which I have overlooked simply because I don't have a need for them--or don't realize I have a need. (28 year old, 1600 acre farmer)

I can tell you how you accept new ideas. You have to know that you have a problem and be willing to recognize that there are problems and that you're working on them, and as soon as you recognize that, then the information starts coming. (54 year old, 3700 acre farmer)

Some of our innovations come about because of necessity.
(44 year old, 8500 acre farmer)

I'm always trying to improve my farming methods. I'm one of those guys who looks for change, and when there's a need for something, I adapt to meet the need. Most farmers are probably too busy. They see a lot of need, but they don't find the time to do anything about it. (66 year old, 1000 acre farmer)

I hear about a lot of the new equipment coming out from my consultant. For instance, when the Dammer Dyker came out my consultant was the first one to tell me about it. Then I went out and looked at it because I had a problem that I needed something like that to help me with. (43 year old, 6500 acre farmer)

My most valuable source of information? I can't say it's just one. It depends upon my need. I have a large network of sources and, depending upon my needs, I contact the source that can best help me. (54 year old, 3700 acre farmer)

Most of the needs expressed had to do with improvements within the farm operation itself to improve time management, to make a particular production more cost efficient or productive, or to eliminate machinery problems. Some of the farmers, however, had needs that were more goal oriented. These needs were not so much specifically directed by a lack or problem within their operation, but they were, nonetheless, very real needs. The intrinsic drive from within was a great motivating force for change and adaptation which prompted learning. One of the interviewed farmers, who was diversified in several aspects of farming with potatoes,

barley, wheat, oats, beef cattle as well as other farm related agriculture businesses, expressed his feelings in the following manner: "What motivates me is to be the very best . . . and the biggest seed potato grower in the state of Idaho." He went on to express the sentiment that most of his management decisions and implemented changes were directed to fulfilling that goal.

Some of the farmers were, definitely, more goal oriented than others. Some did not really seem to be aware of their goals, but upon visiting with them, all of the farmers had ideas, plans, and changes which they were trying to implement, and they were, whether consciously or subconsciously, seeking learning activities. This was emphasized by the farmer who said:

My personal goal is to always do the very best that I can. I don't work so much for money, even though money is very important, but I strive to do my very best even if it costs a little more. When I strive to do the very best possible, the money seems to come. Learning and gaining information is important to make me do my best. Without this, soon I'm no better than anyone else. (38 year old, 1700 acre farmer)

Incidental Learning. A third category for obtaining new ideas came from the learning which took place in the daily activities of operating a farm. Much information was not specifically sought, nor was it always

a result of particular needs or designated learning projects, but it was learning which took place without apparent thought or deliberation and in an unplanned manner as the farmer put himself in a position in which learning was likely to occur. Through observation, talking with others, general reading, listening, and comparing current affairs with past experiences, learning took place. This type of learning was both farm related and non-farm related, but seemed to be an important part in learning especially in introducing new ideas to be further investigated.

This type of learning often helped the farmer become aware of unknown needs. As an example, one 3200 acre farmer, whose main crops were potatoes and grain and who milked 160 dairy cows, spoke of an experience he had involving incidental learning. To secure a market for his potatoes in Japan, the potatoes had to be processed. So he bought a processing plant. He was shocked to find that the quality of his potatoes was not as good as he thought it was when compared to the potatoes of other farmers. In learning from other farmers whose potatoes were bought and processed, he found ways to improve his own potato crop. Other farmers spoke of this incidental learning in the following comments.

I pick up a lot of information from other farmers. Where I sell seed, I visit over 100 potato growers a year. I know which ones of them are good and which ones aren't as good. I ask a lot of questions of those who are good, finding out what they are doing and how they are doing it. (48 year old, 2000 acre farmer)

When I'm driving down the road, I'm always looking at other farmers and what they're doing. I'm always trying to pick up new ideas that will help me do a better job of farming. (44 year old, 1000 acre farmer)

To get valuable information that can help you, you just have to keep working at it. It can come from anywhere and at anytime. You just have to keep an open mind and keep working and thinking. (63 year old, 4500 acre farmer)

You've got questions in your own mind, pretty soon you hear someone talking about that problem and it pricks your mind because you've been thinking about it, and then you can adopt things pretty easy because you can see them as a solution to your problem. (55 year old, 40,000 acre farmer)

I got one idea from listening to a banquet after-dinner speaker who said that he needed a source for a particular item. So, I went back to my farm and became a source. (54 year old, 3700 acre farmer)

Wherever I go, I talk to farmers from Canada or wherever. I've talked to Christmas tree farmers, hayseed farmers, bean seed farmers. You start talking to them about what they do. One little thing that they say, or one little thing that they do --we'll pick up something from them and it will spark an interest, and when we get home, we'll try it. It helps you realize that even though you've been to college, learning is something that is taking place all the time, and it's all around you. (48 year old, 7700 acre farmer)

Information Sources

After the initial contact and prior to the implementation of any innovation or new technology, the farmers conducted much research and investigation to obtain information regarding the technology. In this research related to management or operations, the farmers relied on a variety of information sources. It is evident they placed different degrees of importance and reliability on various information sources.

Almost all imaginable forms of gathering information were used. Again, these farmers seemed to be true information seekers, with each farmer using not only one or two but many sources to receive information. The following quotes illustrate the number of information sources used.

In making changes in my farm practices, the main sources of information come from neighbors, friends, and relatives. However, other sources accounted for change as well. (3800 acre grain, potato and alfalfa farmer)

If there is any resource available that will provide us information about farming, that will help us, we will use it if we know about it. (3200 acre grain and potato farmer and dairyman)

There's a lot of good information out there if we just know who to talk to. Whether it's chemical people, fertilizer people, or the Idaho Potato Commission, Potato Growers of Idaho, University of Idaho, there are people working for your benefit. And if we can just take that information and

make it work for us. A grower has to be aggressive to want to learn. This is where it really happens--on the farm. But you can't go out and do it all yourself. You have to go out to other people and find what's worked for them. We'd never live long enough or farm long enough to make all of the mistakes. (1400 acre potato and barley farmer)

We were thinking about implementing a new idea pertaining to our dairy, and the first thing we did was called a dairy specialist from the college and spent three hours talking to him. We bought the textbook he uses and read it cover to cover. We went in to the dairy extension specialist in the neighboring county and got some books and articles from him, asked him questions, and then we visited with about five different dairy farmers in the area who we consider to be the best dairy farmers and discussed our ideas with them. Then, we brought the Kraft representative out and sat down and talked with him. Then we talked with three different dairy equipment dealers. (1300 acre alfalfa and grain farmer, future dairyman)

We consider ourselves to be farmers who are looking for information pertaining to our farm as well as other things that will help us do a better job and market our crops. We look at magazines, we look at a lot of other farms, we talk to a lot of farmers, we hire a consultant, we subscribe to different newsletters. We rely a lot upon our past experience and try to improve, and if we see a need, we'll try every avenue to satisfy that need from looking at other sources, and if we can't satisfy it [that way], we'll try to solve it ourselves. (4500 acre potato, grain and alfalfa farmer)

We get our new information everywhere. We go to potato schools every year, we work very closely with fertilizer dealers, we work with the county agent and other farmers.

We are active in various production organizations, and we travel a lot so we get to see operations in other areas besides just right around here. We pick up ideas in other areas that we bring back here. (2500 acre potato and grain farmer)

We get a lot of our information from researchers--both private and schools. We attend ag shows, irrigation and equipment trade shows, and grower sponsored schools. We get a lot of information from publications and from fertilizer dealers and the seminars they put on. We get good information from the field days put on at the college. (1800 acre potato, grain and alfalfa farmer and cattleman)

I try to attend all the schools and equipment shows and company sponsored shows that I can. Every year we go down to the Tulare farm show in California. We attend the Potato School, beet schools, grain schools. We go to different things sponsored by the Cattleman's Association and the Polled Hereford Association. All of these, other farmers, and especially the magazines which we read are probably our greatest sources of information. (6600 acre diversified farmer and cattleman)

These sources of information can be grouped into five basic sources. These include (a) interpersonal communication, (b) observation, (c) reading and self-study, (d) attending schools, and (e) self-experimentation. Even though these categories of learning seem very distinct, there is some overlap. For instance, many farmers implemented reading and self-study programs as part of their self-experimentation; also much learning through communicating with others was a part of the learning obtained while attending schools. Normally, most farmers used all of these forms, but the extent to which they used them depended upon the individual farmer and his circumstances.

Interpersonal Communication. As the farmers talked about gaining information, they mentioned several factors which they considered vital to success. One of these was the need for communication with others. For example, one 31 year old diversified farmer who was managing 7600 acres said:

You're always looking at everybody and everything as a possible source of information. You can learn from everyone you meet. However, you want to surround yourself with key people that make a positive influence on you and that provide you with valuable information that will help you to learn and to make the right kinds of decisions.

When used as a source for information, these farmers had communication networks which included other farmers, consultants, extension or producer personnel, soil conservation staffs, product salespersons/ company representatives, university researchers and others.

All farmers considered "other farmers" to be a good source for receiving new information. A fundamental principle of human communication is that "the transfer of ideas occur most frequently between individuals who are alike, or homophilous" (Rogers, 1983, p. 274), that is, the degree to which pairs of farmers who interact are similar in certain attributes, such as beliefs, education, and social status. "When two individuals share common meanings, beliefs, and a mutual

language, communication between them is more likely to be effective" (Rogers, 1983, p. 275). Most farmers enjoyed the comfort of interacting with others who were quite similar and valued the information from other farmers as coming from someone with experience. The following comments illustrate the value these farmers placed on working and communicating with other farmers.

Whenever or wherever farmers get together they talk shop. This is one of the most valuable sources of information I have. (3200 acre, 54 year old farmer)

We have a close relationship with certain farmers who we talk to several times a week. It's almost like we farm together. We compare notes all of the time. (1400 acre, 56 year old farmer)

You can't help but talk to other farmers and learn something if you're open-minded and willing to learn. (4300 acre, 54 year old farmer)

There is one farmer in the area that we and other farmers feel is the best farmer in the area. We go to visit him often just to see what he is doing. (1600 acre, 40 year old farmer)

I get most of my information from other farmers. There are two farmers in particular who, when I started farming, I set as models I wanted to be like. So, I patterned everything I did after them. I visited with them a lot and they've helped me a lot. Since then, I've found other models to look at. (1700 acre, 38 year old farmer)

If you total all the information you get, you gain more from farming neighbors and friends than anywhere else. (2300 acre, 54 year old farmer)

One of the things I do is travel a lot and look at other farms and visit with other farmers. (5300 acre, 28 year old farmer)

I get a lot of my information from other farmers that I sell to. When I sell to them, I ask them a lot of questions about what they're doing and I listen. I can tell the successful ones after about 10 years--they're the ones driving the new trucks. (900 acre, 41 year old farmer)

We're always talking with our neighbors. By our neighbors, I don't mean the farmers bordering our place. I mean the farmers who are farming the same intense methods we're farming. We're always talking to them about what we're doing and finding out what they're doing, and we're always sounding out our problems, trying to find solutions. These are also the same farmers we associate with socially, too. (6300 acre, 31 year old farmer)

These other farmers are probably my most reliable source of information. As you talk to other individuals who are doing well, you pick up little things here and there. You read things and get ideas, then as you talk to individuals, some of those things turn out to be valuable, and some of those things don't turn out to be very valuable, so you try to decipher from other farmers which is which. (1200 acre, 57 year old farmer)

We're watching other farmers all the time, especially our neighbors. We feel our neighbors are some of the most progressive farmers anywhere. We're always talking to them, comparing what we're doing. They're always trying some really weird things, and we learn a lot from them. If other farmers are doing something that's making them money, I want to know about it. I feel comfortable that we're open enough about it out here that we share those things. (5500 acre, 40 year old farmer)

You always try to glean as much as you can from your neighbors. I talk to my neighbors a lot. Last fall, my neighbor and I, who are good friends, took off and went elk

hunting. We were up there for two or three or four or five days. They had had some really good success at some things and I wanted to know about them, so I quizzed him about it the whole time we were there. I spent the whole time just picking his brain. We're trying something different this year. (1000 acre, 48 year old farmer)

Not only were these progressive farmers visiting other farmers and gaining information for themselves, but they had farmers coming to them for information as well. The farmer communication network included both the reception and the supplying of knowledge and information.

The farmer-to-farmer communication network seemed to be going on continuously without conscious thought by those involved. Information flowed freely with high value being placed on its substance. Most farmers were found to be very free with their information and willing to share and interchange with other farmers. Comments such as the following develop a feel for the importance the farmers placed on their intercommunication network.

If you're talking about farming information and practices, you'll find that farmers are very free with their information and will help you all that they can. (1300 acre, father/son partnership)

I have people coming over to my farm all of the time asking if they can see this or see that or asking, 'What are you doing here?' We show them and talk to them and are proud to show them, and when they do something we like, we go over and ask them and we copy some of their stuff. (8500 acre, 44 year old farmer)

We have a good farmer-to-farmer exchange. We have farmers coming to us for information quite often, and just the other day I was visiting with [a neighboring farmer] about their tillage program. (4000 acre, 40 year old farmer)

Where we sell seed, we get to visit with and look over a lot of farmers' farms. Not only do we give them ideas and share our own information with them to help them raise better crops, but we get a lot of ideas that we bring back to help us do a better job as well. I would say, other farmers are probably our most valuable source for information and new ideas. (4500 acre, father/son partnership)

My neighbors come and talk to me a lot about the things I'm doing. Last year my neighbor bought the same equipment that I'm using [after he came and talked to me about it]. It's hard to make a move without them coming over to see what I'm doing. I ask them questions, too. I think it's beneficial. Hey, you don't have all the answers, and they may have a solution that may solve your problem. (1400 acre, 59 year old farmer)

One thing we developed over the years was a rock blade for our harvesters. Of course, a neighbor hears about it or sees it and they want one, so we ended up building rock blades for all of our neighbors' harvesters. We've put blades in over a thousand machines by now. (3800 acre, 69 year old farmer)

Though nearly all of the farmers felt a bond and camaraderie among other local farmers, this feeling of trust and fellowship among farmers for their neighboring farmers was not universal. One 41 year old potato seed producer made the comment: "There is a lot of professional jealousy among neighboring farmers," and he expressed the feeling that neighboring farmers were in competition with each other. Nonetheless, he still had developed a farmer exchange network and relied heavily on other farmers for information and ideas. However, because he did not have good information connections with local farmers, he had to reach farther out to develop those farmer communication ties he needed. He stated:

I call it having access to the world. I pick out six or seven different key people, and with them I have access to the world. . . . One of my key people lives in Maine who does all of the reporting for the Maine potato board. He can get information out of Idaho that I can't get here.

Consultants were also considered to be a very valuable part of the farmer's communication network. The commonly accepted definition of a consultant was a specialist in a certain area of expertise who was hired to supply the farmer with information in that area. An example of a farm consultant hired by these farmers was an irrigation specialist who

monitored the fields and worked out irrigation scheduling for the farmers. Other consultants in the agricultural area included agronomists, entomologists, veterinarians, and agricultural engineers. However, the farmers also listed specialized consultants such as accountants, lawyers, and computer specialists. Such consultants or specialists were hired by many farmers to perform services.

The consultants were considered to be a valuable source of information by providing their expertise to the farmers. However, an additional benefit was derived from the fact that consultants traveled and worked for other farmers and they brought with them information picked up from the other farms. Several farmers stated that this information about new innovations and practices which they picked up from other farmers was more valuable information than the specialized information they provided.

Most of the farmers stated that even though they hired consultants, they still made the final decisions and used their own judgment about whether or not to follow their recommendations. However, they valued the information from the consultants and used them as a sounding board, for a second opinion, as well as for a source for new information and ideas.

All of the farmers used consultants, though some to a much greater degree than others. Some farmers hired a consultant when they had a particular problem or when they were trying to improve on a practice. Many hired a consultant year round to perform a certain task such as taking and analyzing soil or petiole samples. One 31 year old cattleman and diversified farmer of 7600 acres hired a full-time consultant whose job it was to read all of the magazines and journals, attend the schools, visit with other farmers and companies, and then summarize all of the information obtained and bring it to the weekly farm organizational meetings.

Listed below are comments from the farmers regarding the value which they placed on consultants. These comments are typical of many such comments heard during the interviews.

I use a consultant all of the time. You use your judgment, but you get the information which he provides you with for a second opinion. That makes a double check and that's important because you can't afford to make a mistake. The margin of profit is so narrow that you can't make mistakes. (66 year old potato and grain farmer of 1000 acres)

This past year we went through our combines and we hired a guy out of Washington to come down and help us go through them and make changes and repairs so that they would do a better job of harvesting our crops. This past year, as we used these reconditioned machines, it not only put more grain in

our bins, but it allowed us to do it faster as well. (54 year old cattleman and diversified farmer of 6600 acres)

I hire two consultants. What these consultants do mostly is irrigation and fertilizer monitoring and they are very good. Excellent! You just need help. You can't do everything yourself, so you hire a consultant to back up the decisions which you're making. They give you a couple of other opinions of what should work best for you, and you need that. You can't solve all of the problems - you don't know how to solve all of the problems, so you build a group of people around you that you can call on for help. (61 year old sugar beet and grain farmer of 1400 acres)

One of the things that makes us successful . . . is that we hire the best consultant we can find. The consultant we have now is the best that we've ever had. He doesn't make the decisions for us, but he does give us knowledge about watering, fertilizing, weed control, and that helps us make knowledgeable decisions. Before we make any decisions, we consult him. (58 year old potato, barley and wheat farmer of 6700 acres)

I pay a full-time nutritionist to do all of my nutrition work. He sees a lot of other things on other dairies, and he reports to me. For instance, he'll see a new piece of equipment and he'll say, "This is the best I've seen out there." (31 year old dairyman)

The real value that consultants have for me is that we can go out into the field and he can see things that I'm not picking up. For example, we can go out in the field and he can look out in the field and say, "You've got a problem with this," and I've just never noticed that before, being there every day. (44 year old potato, sugar beet and wheat farmer of 1000 acres)

Farm organizations were also considered a valuable source for obtaining information. A sampling of these farm organizations include

Potato Growers of Idaho, National Potato Growers Association, Crop Improvement Association, Idaho Cattleman's Association, National Cattleman's Association, Idaho Wheat Commission, Farm Bureau, National Farmers Organization, Pro Farmers, North America Potato Seed Institute, and Water Users Association. All of the farmers sampled belonged to one or more professional organizations. A 58 year old diversified farmer of 6700 acres stated that he belonged to nine different farm organizations and served on the board of directors for three of these groups. He rated them as very important for gaining knowledge.

These organizations provided information in a variety of ways through conventions, schools, short courses, publications, news letters, and research funding. The following demonstrate the value farmers put on information from farm organizations.

I sit on the board of directors of PGI (Potato Growers of Idaho). It provides a lot of good information for me because we can get the very best people to bring in and talk to us about what we figure we need. I also belong to three or four other organizations. (28 year old farmer, member of 5 different organizations)

We belong to the Potato Growers of Idaho. We rate them really high as an information source and think that their credibility is also good. (56 year old farmer, member of 3 different organizations)

I try to attend all the production meetings I can, like Cattleman's Association Meetings, Potato Growers Association, and like that. I get a lot of information from those meetings and from the farmers that are there. (38 year old farmer, member of 4 different organizations)

We found out about chipping potatoes [potatoes used in potato chip production] by looking through some articles my brother got through the Potato Growers organization. We were interested after reading their article, so we gave them a call to see if we could arrange some contracts to grow them. (54 year old farmer, member of 4 different organizations)

These organizations are valuable to me because they keep me informed about what's going on. (54 year old farmer, member of 8 different organizations)

Another thing we have done is started raising grass seed. I got most of the information about the demand and the high profit potential from the Idaho Crop Production Association, of which I'm a member. (40 year old farmer, member of 8 different organizations)

Farmers received information and services from membership in these different organizations, and the greater their involvement, the greater the benefits seemed to be. Several of the farmers stated that their greatest benefits came from serving as an officer, a director, or a committee member of an organization. One 67 year old potato and grain farmer of 2450 acres, who was currently serving as president of a national grower association, had strong feelings for the benefits gained from this type of service. When first contacted, he was about to leave on a speaking

assignment in Nebraska for the organization. He was extremely involved with this organization and stated that his involvement had provided him with numerous opportunities to see new ideas firsthand and he was able to meet with farmers across the country to find out what they were doing and bring many of the applications back to his own farm.

Comments from other farmers concerning their service involvement in organizations and the benefits gained therein follow.

The reason I serve and give of my time [on the board of the Potato Growers Association] is partly a selfish reason. I want to serve because the growers have asked me to, but it's the information I find when I go there. That's what I go for. (47 year old farmer, member of 5 organizations)

I'm involved with several different grower organizations. I'm working on one [committee] in which we're trying to come up with some new strategies to help tell the farmer's side of the story when it comes to pesticides. It takes a lot of my time, but it's been fun and interesting. It also provides a lot of channels to learn a lot more information. You meet people that come from a different background, it's helped me to widen my perspectives. (28 year old farmer, member of 5 organizations)

I was on the board of directors for the local cooperative. While I was there, we tried test plots and tried a variety of different things, and we tried all kinds of different chemicals. From those trials and using those chemicals, it educated me as to what I should be using on my farm. (42 year old farmer, member of 3 organizations)

One of the areas that the farmers who were involved rated very highly as an information source was that of a local farm organization. In several locations, farmers had formed a local farm organization. These farmers met together in one of the farmer's homes on a regular basis, sometimes as often as once a week during the winter. At these meetings, they invited experts to discuss common problems, and they exchanged views regarding successes and failures. The purpose for these organizations was for the farmers to be of benefit to each other by sharing information.

One particular local organization was comprised of about 50 farmers in the area. All farmers from the area were invited to participate, though not all chose to do so. The original intent of this organization was to aid the farmers in gaining new information and solving problems. Many of the farmers realized this benefit but also maintained that there was a strong stimulus to learn in order to contribute to the organization and be of help to others. Secondary benefit arose as the farmers found that, as an organization, they could buy fertilizer and equipment and market their product at a real financial advantage. One of the instigators of this local organization was a 40 year old cattleman and diversified farmer of 5500 acres. He expressed his feeling as follows:

One of the things we've done recently is formed a local farm organization. We meet regularly every other week. We'll bring experts in to discuss problems with us and sometimes we'll just brainstorm about things we need in the community and what's working for others. We feel, as farmers, we're not competing against each other, but we're trying to help each other out to succeed. We think that rather than each of us trying to keep our little secrets, if we all get together we can all do a better job. Also, we can get more of the buyers coming here to buy our crops because we're trying to improve and we're raising better crops. We've also got a lot better buying power as an organized group because we buy in such large quantities and we're working for better prices. Just in my fertilizer bill alone, I've saved \$30,000 this past year, and on my equipment purchases I've saved \$40,000. This may not sound like a lot of money, but every little bit helps.

Another 54 year old dairyman and diversified farmer of 3200 acres also belonged to a local farmer organization. His organization was comprised of farmers from a community where selected individuals from the area were invited to attend. He had this to say about the organization:

One of the things that has really helped me gain information about farming is that a bunch of local farmers got together to form a local farm organization. During the winter, we get together and discuss different farm problems, whether it be chemicals, fertilizer, marketing, machinery, or whatever. We've found that most farmers aren't competing against each other, but we're competing for the market, and we find that it benefits us to help each other. For instance, if we're raising the best barley in this area, the produce buyers will buy not

only from the neighbors but from me, too. . . . If I have a problem, there is usually a farmer who has had that problem who can help me with it.

Another important link in the farmer communication network was salespersons and company representatives. All of the farmers used business representatives (salesmen, service representatives, research personnel, and engineers) as sources for information. Many of the farmers stated that these representatives were the best or one of the best sources for information they used. The representatives most often referred to by the farmers were the fertilizer representatives, but others mentioned were the representatives from the chemical companies, implement dealerships, computer companies, irrigation companies, building contractors, and seed companies.

One of the reasons the farmers gave for valuing the information received from the representatives was that they had access to information regarding all new applications or products, and they were able to observe so many operations that they could tell them of any successful applications being tried and make appropriate recommendations. A sampling of the comments made by the farmers follows.

My most valuable sources of information that I can see are commercial companies and their company reps. I use them a lot. They're a great source of information. . . . When it came to buying pivots, I found most of my information from the dealers. I studied the systems out, but the salesman and the factory people were a great help. . . . And these new chemical changes that are taking place we hear about from the chemical companies. They will tell us themselves when we can no longer use them. (2000 acre potato and grain farmer)

I'm associated with a private research potato seed company out of California. These people know they have to get out the right product to those who are buying or we'll quit. They try to keep up on the latest technology, and that's the future--these companies that are high tech. . . . They tell me with their sales people what's happening and keep me up-to-date on the future and what's in their program development. (1500 acre potato, grain and alfalfa farmer and cattleman)

We built a new building recently, and we got most of our information from the contractor who took us around and showed us a lot of buildings and things which he had been doing which we liked very much. (4500 acre seed potato, grain and alfalfa farmer)

We probably get most of our information from the businesses that we deal with. From the roguers, the fertilizer dealers, irrigation companies, implement dealerships and the people we market with. These are all good sources of information and help us a lot. You have to develop a rapport with these support groups so that they'll reach out and help you and provide services for you. (8000 acre potato and grain farmer)

Our local implement people here are really good to work with. They try to provide us with as much information as they can when we need it. (1000 acre potato, sugar beet and wheat farmer)

I had a fertilizer salesman that helped me a lot, and when something came along that he thought I needed to see, he'd come and gather me up and we'd go see it. One of the new innovations we've adopted this year is to put the herbicides and fertilizers together and apply them in a single operation rather than two separate operations. We got the information from our fertilizer man. He suggested we do it, we tried it, and it really works. (5000 acre cattleman and potato, grain, pea, alfalfa farmer)

One of the reasons we like to work with the chemical companies and help them with their experimentations is because it keeps us right on the forefront of progress so we can take advantage of those new things that are just breaking in the industry. (4500 acre seed potato, grain and alfalfa farmer)

I think the field men for the fertilizer companies are extremely important. You have to listen to the field men. You've got to really pay attention to what you're doing. You can't know everything, so you need to get help wherever you can. (1000 acre grain and potato farmer)

Primarily on our farm, when it comes to fertilizers and things like that, we rely heavily on the fertilizer dealers to give us good recommendations from their soil testing and stuff like that. (2800 acre cattleman and potato, grain and alfalfa farmer)

One of the key elements for determining which company was selected for use by farmers was the kind of information as well as the service the company could provide. If they did not provide current information and quality service, most of the farmers conducted their business elsewhere, even if it meant paying higher prices. The farmers

were conscious about prices, but service and information had a value attached to it that went beyond the buying agreement. Some of the farmer's comments that reflect this sentiment follow.

I buy fertilizer from the company that can give me the best cost plus service. Sometimes I waive cost for service. If a company will give me good, knowledgeable service, I prefer them to a company who may be a little less money but won't help me. One of the most important things when I buy fertilizer is to have someone come up after I have applied the fertilizer to see how things are going. I don't want someone whose only concern is to sell me his fertilizer. (1600 acre potato, malt barley and wheat farmer)

I feel that a lot of these dealers are missing the boat. They're just a salesman. They need to have closer communication with their clients and provide better information. We would sooner have someone that we knew was competent and could provide us with good information and was honest and pay more for it. (6700 acre grain, potato, and alfalfa farmer)

I wasn't satisfied in getting information with the computer places that sold computers. Everytime I went in they'd talk way above my head. So, I bought my computer from an independent fellow who works with computers all the time. He's going to train and he'll take care of all the problems-- he'll maintain it and he'll repair it. (1200 acre cattleman and wheat and potato farmer)

I like to deal with companies that I can relate to and deal with on a first name basis, where they know me and I know them and they can rely upon what I say and I can rely upon what they say. Service is the key. Even if it costs me more money, I'll do it. (1500 acre potato, alfalfa and barley farmer)

We were working with one implement company, but we felt that they just quit trying to make improvements on their product. So we switched companies to one that seemed to be more at the forefront of new ideas and that seemed to work better. Another reason we switched is that we needed a big, wide belt piler and we took our plans down to have this company build it for us and they told us it wouldn't work and they wouldn't build it. So we went to this other company that we are dealing with now and they built it for us. It was their best selling item last year. (4500 acre potato, grain and alfalfa farmer)

When we first started with pivots, several of us got on the irrigation dealer because the service man would come out when we called with a problem and open up his service manual and spend two hours reading, trying to find the problem. We told the dealer that if he didn't get a decent service man we'd go someplace else because we could buy the manual and read, and we weren't paying someone else 50 bucks an hour to come out and learn on our time. (1600 acre potato and grain farmer)

Not all of the farmers put a great deal of trust in some of the companies that served them. They had experienced problems in the past or felt that a lot of the company-related people were more interested in selling their products than serving the customer and really did not have the best interest of the farmers at heart. However, this seemed to be the exception rather than the rule. Most felt that the company personnel were really trying to help the farmers and that their attitude was that the better the farmer was doing the better the company would do also. Following

are some comments from farmers who had problems using company personnel to supply needed service and information.

I feel that a lot of information that we get is from the developers (R&D) within the different companies. We're a little leary about some of these new products since they do come from the developers who might be trying to push their products. However, those that have proven themselves we accept more readily. . . . We get a lot of our information from dealers. However, they have to earn our trust. We are skeptical of most dealers. (40 year old farmer of 4000 acres)

One time we did have to have a serviceman come out. We tried to get all the information we could from him about how to fix the baler, but he couldn't fix it, so after he left we went to work on it again and we found the problem. (53 year old farmer of 1800 acres)

We always want to try new things, but I always tell those who come out and try to push something on me that I would rather be sorry that I didn't use their product on all my place than be sorry I did use it. (48 year old farmer of 4000 acres)

As a source of information, the extension service was rarely used by the farmers. Most of the farmers interviewed believed that the county agents were good and served a useful purpose. They felt that the extension service played a valuable role in the farming picture as a whole by providing a great service to the communities and agriculture, but, as far as these farmers were concerned, their information was out of date.

One of the explanations given by several farmers was that information obtained by extension had to be proven under study and testing, which sometimes took several years, before it could be made public. By the time the extension service had information about a particular farming practice or crop variety available for the public, these farmers had already been using it for years. One particular farmer, whose father was a county agent, expressed the sentiment of many of the farmers in the following comment:

It's an interesting thing. My dad is an extension agent, but the extension people are behind us. We get most of our information from the entrepreneurs who are out there pushing new kinds of things, developing new varieties, new fertilizers, new machinery, new techniques. We get our information and ideas from them, and we do a lot of self-experimentation. I hate to say this, but we're just miles ahead of extension. But, my dad helps a lot of people. A lot of farmers do a better job and stay in business because he helps them. But, for us, they are just not much value. (40 year old farmer of 5500 acres)

Other farmers commented on their feelings regarding extension.

In all the years that I've farmed I've only used the county extension services once to verify the extent of damages caused by chemical drift from a neighbor spraying. I feel that they play a very important role, but I just don't use them. (54 year old farmer of 3200 acres)

I don't work with extension very much because I feel that most of the things they are promoting, I have already adopted, and I haven't been able to get much from them. Usually, it's a couple of years between when something comes out and when the extension agent becomes knowledgeable about it. But, they're probably a lot better than I think they are. (38 year old farmer of 1700 acres)

We hardly ever go to the local extension meetings unless they're on our own place. Sometimes I'll go, but its usually old material where they're just sharing with other farmers the things that we're already doing. (31 year old farmer of 5300 acres)

There are new things happening all the time and before the university or extension can say, "Hey, this is the thing to do," they've got to have a lot of study done and this takes a few years. They can't make a statement and say this is the way to go. But someone like me can do experimental plots on my own and I can find out in a hurry what works and what doesn't. (40 year old farmer of 5500 acres)

We don't use county extension very much. We find that we know more than they do about potatoes. I get the information a long time before they do. (48 year old farmer of 2000 acres)

There were some of the farmers, however, who stated that they did use the extension services on occasion. Other farmers indicated that their involvement with extension was in the form of having the extension service research information for them. Another benefit that some of the farmers commented on came from the field days sponsored by extension which were held on their farms, and the schools and short courses which

extension sponsored. Some of the comments made by the farmers regarding their use of extension follow:

I've learned several things from the extension people. One of the things about the extension people is that they're always there to help. (54 year old farmer of 4300 acres)

When I have a problem, I like to go to the county agents. I know their network of extension people and they're about as good as there is. I had a county agent who was good at irrigation. I had a problem and he came out and worked with me and really helped me work out my problems. He spent a couple of days walking around and, what it boils down to, he showed me how to irrigate. I still really like that county agent. I'm a pretty good friend of the extension man at the research station. I talk with him yearly or more often about the new varieties. I rely on that quite hard. The older you get, the more you realize that you can't know everything even if you read a lot and do a lot and that you've got to rely upon others. The county agent and I are the best of friends. (54 year old farmer of 5000 acres)

The extension is good, but they are mostly cow men and can't help us much with our crops. But we do use them. We hire the two extension people every year to work with us during potato harvest. They are good workers, but they don't know how to farm very well. (Father/son partnership of 4500 acres)

If I have a problem, I get the county agent to come out. He rarely has the answer, but he will go find it out for me, which I really appreciate. (58 year old farmer of 6700 acres)

We use the extension agent quite a bit. He's a good man. One of his specialities is beets which we are heavy growers of. We do a lot of things with him. (61 year old farmer of 1400 acres)

Through the extension service, I volunteered the farm for irrigation schools which they held at my place. This has helped me out a lot. (27 year old farmer of 590 acres)

Besides the County Extension Service, there are other governmental agencies which are involved in providing assistance to agriculture. The agencies which the interviewed farmers were involved with included the Soil Conservation Services (SCS), Agriculture Stabilization and Conservation Services (ASCS), and government research stations. The government research stations will be discussed separately, along with private research facilities.

Many of the farmers were hesitant to discuss their feelings regarding the SCS or the ASCS, but the general consensus was that, as an information source, these agencies were of little value except to furnish information regarding government programs available to the farmers, and some of the farmers even stated that they preferred to get this information elsewhere if at all possible. Several farmers requested that the recorder be turned off during this part of the interview because they used the particular government programs overseen by these agencies and were concerned that there might be repercussions if these agencies could trace their comments back to them. In general, the feeling regarding these agencies was that they are an essential part of the farmer's operations for

those who used government programs, but they do as little as they can to assist the farmers. They felt that they were better off if they had less to do with these agencies. Some of the recorded comments regarding the SCS and ASCS follow:

Yes, I use the ASCS office, but I don't get my information from the local ASCS office. I go to the [neighboring county] ASCS office to discuss my farm operation and determine my options and get the information about the available programs. Then I decide what I want to do and present my plan to the county ASCS office. The reason for this is that the county ASCS office isn't free with the information about options. They want to dictate to me what option I have to follow, and they want to make my management decisions for me. (35 year old farmer of 3800 acres)

We have completely written the ASCS out of our story. Uncle Sam is not a farmer. They make the most stupid decisions. (56 year old farmer of 1400 acres)

Actually, you find out things from other places, then you go into the ASCS office and ask them about it because they won't tell you about it or tell you about all the programs available unless you ask. We find out about a lot of the government programs from newsletters and things we subscribe to, and we find out things that they don't even know about at the ASCS office yet. (63 year old farmer of 4500 acres)

The ASCS tells me what the government programs are. Other than that, they have no value. I don't even know what the SCS does. (56 year old farmer of 1600 acres)

Significantly, there was not a single positive response regarding these two agencies, except to note that they were necessary for those who participated in government agriculture programs.

In addition to farmers, consultants, producer organizations, industry, and government agencies, there are a lot of other places where information is shared through communication with others. Many of the farmers commented that in the course of doing their business there is always someone from whom information can be picked up, if one is only receptive to the information and listening for it. Much of the information was not directly related to their farm operations, but the farmers felt that it was a valuable part of their overall information seeking and believed that the value of this type of learning did transfer over into their farming. Examples of this included information on new innovations coming out, politics, religion, cars, and world, national, and community events. Places where they reported hearing this type of information were the post office, the service station, co-operatives and other stores, church, scouting and service organization meetings, the fishing stream, or anywhere else where they might run into people. One 53 year old sheepman and farmer of wheat and barley said, "Information comes to me from so many directions--not just those things considered farm sources, but other

sources as well." Another 43 year old potato and grain farmer made this statement, "We probably get most of our information talking to other people, both farmers and non-farmers alike."

Farmers like to participate in conversation for the social aspect as well as for the learning experience. All of the farmers were very committed to their occupation, and even when socializing, conversation turned to the farm. The wife of one 28 year old farmer who farms potatoes, malt barley, and wheat said about her husband, "I get a little upset with him because everywhere we go and everything we do, all he wants to talk about is farming. That's his whole life."

Of all the sources for gaining new information and ideas that were discussed, interpersonal communication seemed to be the medium most frequently used by the farmers to receive and transmit information. Of the various areas covered within this section, other farmers seemed to be the source used most often. Not only was it used most often, but it was perceived by the farmers to be the most valid source for receiving new information.

Observation. In the course of the interviews with the farmers, observation, and its importance in the process of gaining new information were mentioned many times. The farmers all stated that they were always

looking around, paying attention to the environment in which they lived. They were constantly aware of what was happening on their own farms and comparing it to their neighbors farms. If a particular farmer was doing a visibly better job in some aspect of his farming, they wanted to know what he was doing. To discover this they not only communicated with the farmer and others, but they also observed what the farmer was doing and what the results were and tried to pick up any information that might help them.

Neighboring farms were mentioned most by the farmers as sites where observational information was obtained. Items they observed included condition of the fields, new procedures, new crops, and equipment. Other sources of observational information mentioned included county and state fairs, equipment shows, factories, travel/tours, and to a very limited extent radio and television. Farmer comments regarding observational learning follow.

You follow a farmer driving down the road. His head is always cocked looking out across his neighbors farms. He goes by his machinery yard and he about goes off the road.
(44 year old, 8500 acre farmer)

He has his own plane and he's always flying around looking at his fields and other's fields, and if he sees someone else whose fields look better than his, he goes to visit them to try to learn why. When we're flying over our own place he looks for

trouble spots that he might not see on the ground, and then he tries to solve the problems we have. (Wife of a 43 year old, 6500 acre farmer)

When I was first considering minimum tillage, my first source of information came from the state fair advertising and equipment displays. I could see some promise for possible adaptation, so I started seeking out specific information, but my introduction came from the fair. (35 year old, 3800 acre farmer)

Since I spend so much time in my truck, I spend a lot of time listening to the radio. I listen to farm reports, marketing forecasts, and I don't miss Paul Harvey. I feel that most of radio is a bunch of junk, but I would like to listen to more farm type programs. (54 year old, 3200 acre farmer)

I saw someone who had good [potato] crops in an area where it was hard to have good crops of potatoes, so I went to the man and asked him how he was able to have good crops. (48 year old, 2000 acre farmer)

Our neighbor is a good neighbor to have because they try everything that comes along and we are able to watch them and learn from them. (40 year old, 4000 acre farmer)

I go to the Tulare farm show every year. They have a lot of stuff there that's not really applicable to our area. . . . but you see a lot of things in the way of hydraulics, electronics, and such that you can apply here. We try to take advantage of any schools or factory sponsored trips where they send us back to the factory, like John Deere and Lockwood. And there's a lot of good information you can get just by traveling outside the area and seeing what they're doing in other places. (44 year old, 8500 acre farmer)

We go on all the company tours that we're invited to. Last year we went to Europe looking at farm machinery at different farms and how they did things there. . . . When we were traveling in Holland, we saw the most efficient potato

warehouse we have ever seen. We have tried to pattern some of the things we do after the things we learned then. I'll never forget how clean their operation was. (63 year old, 4500 acre farmer)

I go to different dairy equipment shows and look at the new things coming out. Probably not as often as I'd like to, but I do go to them quite often and I learn quite a bit from these shows. . . . Another thing I do is visit dairies. There are some dairies that are outstanding and I love to visit them. Everytime we go anywhere we visit them. When we go on a family vacation, we plan in several dairies to go visit. (57 year old, 2900 acre farmer and dairyman)

We have a satellite dish--I get a lot of information from the ag programs that come on. And it's good where we can record them easily, even when we're not at home. Then we can watch them and even rewatch them later when we have time. I think in the future we will have even more and more on satellite that pertains to agriculture. (42 year old, 1800 acre farmer)

I pick up a lot of information at the state fair as far as equipment, machinery, and new ideas go. I get a lot of information every year at the ag equipment show at the Mini-dome, and when I have the opportunity, I go to the ag show in Tulare. (44 year old, 1000 acre farmer)

These, and many other similar comments illustrate the significance of observation in the learning process. Generally, observation was the initial contact point with a new innovation that sparked the active pursuit of information about that innovation.

Reading and Self-Study. A third category of learning sources which played a major role in the farmers' process of gaining information was reading and self-study. All of the farmers spent a considerable amount of time reading, especially during the slack seasons, and all felt that the investment of their time in reading was well worth it. One typical comment was made by a 51 year old dry farmer who has received his doctorate in philosophy. He said:

I read a lot. I subscribe to several farm magazines, and I read these things related to farming and I read other things as well. I guess I read about 2 hours a day. In the summer, it's almost nothing, but in the winter I read a lot, so it probably averages out to about 2 hours a day. Probably half of that reading is related to the farm, the other half is related to pleasure, Wheat Commission business, courses I teach at the church, or just to keep informed.

Several of the farmers commented that reading was their most valuable or one of their most valuable sources for information, and all of the farmers expressed the value they placed in ideas and information received from reading. Farm magazines and journals were the most commonly read items, but other reading materials including books, reference manuals, service manuals, operators manuals, newsletters, and advertising literature accounted for learning as well. The following comments illustrate this general involvement in reading and self-study.

One of the ways I get new information is by reading as much of the trade publications and journals as I can. When I look at journals, I don't just read the articles that apply to my operation, I read other articles as well. Even though they don't apply directly, there are always things you can learn. . . . Sometimes articles I read now might not apply, but I realize that sometime in the future they might. So I usually read magazines from cover to cover. Another of our major sources of information is books. We read a lot and get a lot of information. When we need to investigate some operation or project we're looking at, we try to find books on the subject to read. We go to the library and research the topic thoroughly and order in books on the subject. (1300 acre wheat, alfalfa, and barley farmer)

There is information that we need all the time. You just got to get in there and read about it. I read a lot. I read farm magazines. I read them every night when I'm sitting on the pot with nothing else to do. (2800 acre cattleman and potato, wheat, alfalfa, and barley farmer)

I think that the most valuable source that I have for gaining new information is the farm magazines that I subscribe to. I read them and they spark new ideas and inform me about what is going on. I try to adapt those things that make sense to me. In my cattle operation, my biggest source is, again, cattle magazines. (6600 acre cattleman and potato, sugar beet, wheat and grass seed farmer)

We bought our last tractor out of Nebraska. We found out about it by reading an add in the Capital Press [an agriculture weekly newspaper]. It looked like a good deal so we went and looked at it. We subscribe to the Capital Press and we read it. (5300 acre cattleman and diversified farmer)

Another good source of information is magazines. They have a lot of good articles. A lot of the information is repetitious. I find myself reading a lot of magazines. I subscribe to at least a dozen magazines. (1500 acre potato, alfalfa, and barley farmer)

I don't think you can get along without a couple of magazines in the area you specialize in. They provide a lot of valuable information. (3800 acre wheat and potato farmer)

In marketing, I really use a lot of national newsletters to get information. These give me a lot of information and it gives me kind of an idea where the economy is and lets me know what the market's doing. (5500 acre cattleman, horseman, and diversified farmer)

Several of the farmers commented that they had so much information available to them in the way of reading material that one of their biggest challenges was to evaluate the potential relevance of an article or book before reading it. The amount of reading material available forced them to be selective in terms of what they considered important and worth reading. It was virtually impossible for them to keep up with all of the readable information available. Two statements from the farmers regarding the volume of reading information available are included below.

I get a lot of information from articles and magazines. . . . There's 20 to 30 different magazines that we get every month and we get a lot of good information out of those and a lot of new ideas as we read through them. There's getting so many now that it's getting difficult to keep up with them, so I read them on a selective basis, but I thumb through them all. If I see a title that interests me or a topic that gets my attention, I read the article. (59 year old farmer of 1400 acres)

I subscribe to six farm publications, but I don't have time to read them all. Mostly I just glance through. I read a lot of

ads, and sometimes I think that I get more out of them than I do the articles. (41 year old farmer of 900 acres)

The total number of journals and magazines subscribed to by the 50 farmers was 485. The fewest number received by any one farmer was 3, and the most was 21. The average number received was 9.7 per farmer. Some of the farmers stated that they read the journals and magazines cover to cover while others stated that they scanned these publications, reading only those articles which they thought would benefit them.

When discussing the reliability of a magazine or journal as a source of information and as an impetus for changing practices, most commented that magazines and journals provided a good introduction to new innovations and supplied information on a variety of subjects; however they did not trust them as a sole information source, but used them only as a guide for seeking more specific information elsewhere. Several farmers also commented that the reliability of magazines and journals was sometimes questionable and needed to be evaluated and researched further. As an example, one 28 year old farmer, who subscribes to 5 different publications and ranked them as one of his most valuable sources for information made the following comment.

One of the things I've noticed from reading and from research is that there are a lot of contradictions. One article will say to do one thing, and the very next article will say to do something else. So, you need to evaluate those things from your past experience and education and do more research and determine what will work best for you.

The reading and self-study of the farmers also involved books and manuals. The books most often used were those that provided information to solve a problem or that provided technical information regarding some aspect of farming such as feeds and feeding, dairy operations, soils, computers, equipment, or buildings.

All of the farmers made mention of the fact that whenever they purchased a new piece of equipment, they insisted on obtaining the operator's manual, the service manual, and in many cases the parts manual for the particular equipment. They used these manuals as guidelines in service and maintenance as well as for repair of the equipment. Most of the farmers mentioned that they did most or all of their own mechanical repairs and that these manuals were essential to their ability to do this. The following comments are typical of those received by the majority of the farmers.

Whenever I buy a new tractor or piece of equipment, along with the owner's manual I request a service manual and, in addition to that, we request that they send us to their schools

in the wintertime on those pieces of equipment. We do most of our repairs on our equipment, unless we're hampered because of something we can't do because of special tools or because we don't have time. (1000 acre potato, sugar beet, and wheat farmer)

I make about 90% of all my mechanical repairs. I get most of my information from the service and operator's manuals which I get when I purchase any new equipment. (960 acre sheepman and wheat and barley farmer)

Not all of their reading and self-study was farm related. These farmers interests and hobbies covered a wide range of activities including skiing, golf, religion, scouts, art, wildlife, and fishing. Many farmers commented on the amount of reading and research done for these particular interests. An example of this is the comment made by a 53 year old wheat and barley farmer of 1000 acres.

Lately, I've been reading and speaking out against wolves in Yellowstone Park. I've been reading some research put together by [an environmentalist] about the wolf habitat and Yellowstone Park, and I'm convinced that the wolves should not be re-introduced there.

Attending Schools. A fourth source for obtaining information was schools, short courses, seminars, and workshops. All of the farmers stated that they attended short courses and schools throughout the year and found them to be of great value in keeping current and aware of new innovations.

The most frequently attended schools were those sponsored by various companies with which the farmers worked. For example, almost every farmer mentioned attending schools presented by their fertilizer dealer. These schools were one to two day sessions to which the companies brought specialists or field men to instruct the farmer in some specialized aspect. Besides fertilizer companies, other companies mentioned as sponsors for this type of short course instruction included chemical companies, irrigation companies, computer companies, and equipment dealerships.

Another type of seminar or short course were those put on by colleges/universities, extension research, or grower organizations. These were also short term courses and were evaluated by the farmers as very beneficial to them in the learning process. One 55 year old diversified farmer of 40,000 acres spoke of an experience he had at a school and his feelings about this type of program.

I first heard about the no-till drill at a school I went to in Washington. I was really impressed with the root system of the wheat in their tests, and I had had a problem with not having a large enough hopper to hold enough seed, so I determined to buy a drill before I left the school. I try to attend every show and school that I can go to. I go to a number of schools, even as far away as Canada. A lot of them are repetitious and have the same things I've seen in the past. But, even so, I learn something. I like to be on a first name basis and talk to all the experts--the best that I can find.

Other schools attended by several of the farmers were service schools sponsored by various equipment companies. When they purchased a new piece of equipment, many of the farmers requested that the dealer send them to the company service school so that they could better understand how the equipment functioned and how to service and repair it. These schools generally lasted anywhere from one day to one week in length. Basically, this type of schooling was provided by farm implement companies where the schools were directed toward training in regards to tractors, sprayers, combines, balers, or other pieces of farm equipment, or by irrigation companies where the schools focused on items such as pivot operation and repair. Not all farmers participated in this type of schooling, but those who did appraised these courses as beneficial and very timely in keeping their equipment in proper order and repair. One 56 year old seed potato and malting barley farmer made the following comment.

We paid the company to go to the same school that their servicemen go to so that we could learn how to service [our pivots] ourselves. Now we seldom ever have to call the servicemen. We take care of them all ourselves.

A sampling of the comments made by the farmers regarding their involvement and appraisal of short courses and workshops in general

demonstrate the wide range of activities this type of schooling covers and the benefits perceived by the farmers from their attendance.

When new chemicals come out, we generally hear about them from the schools we attend put out by the chemical companies. We attend schools like the potato schools, fertilizer schools, and commercial applicator courses. From these different courses, I learn quite a few things that I use in my operation. (54 year old farmer of 1700 acres)

During the winter, I'll go to all of these schools put on by the producer organizations, the university, and the commercial companies. They're a great source of information. I know a lot of the different company reps on a first name basis. (39 year old farmer of 2000 acres)

We go to a lot of different schools in the winter. They had a chem irrigation school, and at that school one of the speakers talked a little about fertilizer placement. That is probably where we first heard about it. . . . This one practice has probably made more difference in our farming practice than any other single thing we have done. (40 year old farmer of 5500 acres)

I went to a school put on by a fertilizer company. They brought in a man from Wisconsin who spoke about plant physiology and how plants grow. I needed that information, and it was so good that I followed that man around to his next ten presentations. I followed him to [a neighboring community], and everywhere else I could, and every time I heard him, I learned something. (48 year old farmer of 2000 acres)

We just bought two new tractors and the agency we bought them from is sponsoring a school to teach us how to operate them. We have never had to attend a school to learn how to run a tractor before, but the tractors are getting so sophisticated with so many different options, hydraulics,

electronics, computers and stuff that you have to go to school or learn in some other way how to operate them. (46 year old farmer of 7000 acres)

A few of the farmers mentioned that they occasionally took college or university courses, but such courses were not seen as a source for gaining new information on innovations and new technologies as were the short courses previously mentioned. There were several reasons suggested for the limited involvement with college courses.

1. The farmers believed that the college courses were too long, stretching out over a period of weeks and sometimes months, interrupting their farming activities for an extended period and requiring, in some cases, a daily commitment of time and travel.
2. The farmers felt that college courses were too grounded in theory and out of touch with practicality.
3. The farmers felt that college courses were inflexible and did not focus on answering the needs the farmer was encountering but rather of meeting rigid requirements set up by the school.
4. The farmers felt that college courses were out-of-date and did not teach new technology.

In view of the the preceding comments, it is significant to note the level of formal education attained by the interviewed farmers as reported earlier in this chapter. All but four of the farmers attended either college

or vocational school, and all felt that it was very important to their education in general and very beneficial to them. However, at this point in their careers, they felt that college courses did not best meet their needs and did not provide information on current innovations and technologies. This sentiment was best summed up in the comments of two farmers who stated the following.

Change for the farmers is happening so fast, and there is so much out there to know, that the farmer has to learn in faster methods than those normally thought of as learning sources by most people. I don't have time to go back to school, so I've got to get my information in a more concise, usable form. . . . I find that my previous school was very helpful to me. It's given me a good background of the basics to fall back on, so when I hear of something new coming along, it's easier to understand. (54 year old farmer with Bachelors Degree)

An education at college--all it does is tell you methods and steps to get information. If I were still using the information I got at that time, it'd be obsolete, but it teaches me how to use libraries, how to use extension, how to use research people. . . . My education at college has helped me to broaden my mind, to help me deal with the wide range of problems you encounter in farming. College is a process of learning how to learn. It's not so much what I learned there, but the process. (48 year old farmer with Bachelors Degree)

One exception to this was computer courses where several of the farmers stated that they had learned to operate their computers by taking courses from area colleges and universities. There were also a limited

number of farmers who stated that they had recently (within the last 2 years) taken college courses in marketing, welding, or mechanics.

Self-Experimentation and Research. A final category of learning sources was self-experimentation and research. One 61 year old sugar beet, wheat, and barley farmer commented, "Farmers are innovative in the ways they get information. Farmers are always experimenting with one thing or another trying to figure out how to do things better." The farmers all seemed to be very creative and involved in a variety of things pertaining to self-experimentation. When they saw a particular need in their farming operation, they proceeded to fill that need. One 54 year old dairyman and diversified farmer said, "Necessity is the mother of invention. If we need a piece of equipment to do a particular thing and we can't buy it, we will build it. If you can envision something, you can build it."

This innovativeness and self-experimentation that the farmers were involved with became more and more evident as the interviews progressed. During the interviews, farmers alluded to being among the first to try or do a particular practice. The attitude of many of the farmers was expressed by one 67 year old farmer of 2500 acres who stated:

I remember a professor. I always felt that I was a little ahead of this axiom that he had, "Be not the first to do, nor the last to cast the old aside." We've always tried to be right up there amongst the first to do, but we analyze it well first before we try it.

Some of the farmers expressed some hesitation in doing a lot of experimenting because of the financial commitment. Yet, in spite of their hesitation, all of the farmers were involved with practices which were at the forefront of the industry. One example of this was a 54 year old farmer who stated, "I don't try to be the first. The first ones are sometimes expensive and it's just as easy to let someone else dabble." Yet, this farmer has been featured nationally by several magazines for his research and application of several innovative technologies such as stem splicing in the potato industry, his virus-free potato seed business, and his early generation potato seed.

Many pieces of machinery were designed and developed for specific purposes by these farmers. It was interesting that in several cases, more than one of the farmers were involved in innovations dealing with the same problem, and, in most cases, their solutions were very similar. One example of this was the self-unloading potato truck. Prior to commercial production and marketing, several of the farmers were working simultaneously with the concept of self-unloading trucks and had

prototypes they developed on their farms. Though the designs varied somewhat, the principle behind the operation of the machines was much the same.

Modification and adaptation of equipment was also common among these farmers. Most of the farmers commented that many of the pieces of equipment which they purchased needed to be modified to function more effectively. Since most pieces of equipment are generic in nature, built for average conditions and multiple uses, the specialized nature of each farming operation required adaptations on the machinery to fit the unique application. Here again, most of these modifications were self-experimental and were usually envisioned by the farmers as a means of increasing efficiency or productivity. Following are statements from the farmers regarding their self-experimentation in the embryonic stage of development, in the adaptation of several pieces of equipment, or in the application of innovative practices.

I like to think that I've started more ideas than I've followed. But I'm not saying that we haven't tried a lot of things that we've seen on other farms. In one of our practices, I know that we were one of the first ones that did it because the extension came out and monitored what we did and then wrote some articles about it. (Potato, wheat, and barley farmer of 8500 acres)

I do a lot of my own machinery innovations to fit my own operation. In fact, I built the first self-unloading bulk truck which I still have. I was out unloading a truck one day and said to myself, "Why do I have to work so hard to unload this truck? If I do this, what would happen?" So that winter I went into my shop and took one of the old trucks and started trying things. I'd do something and try it out, and then change some things so that it would work better and try it out again. Pretty soon I had it and it worked. After we had worked with it a few years, one of the local manufacturers came out with a self-unloading truck that was similar to ours. As far as I know, they never saw our trucks. . . . I built the first potato scooper used in cellars. I got an old piler and modified it. It doesn't work as well as the ones used today which everyone has, but it worked well and I had it before anyone else around had one. (Alfalfa, grain, and potato farmer and cattleman of 1700 acres)

Between us and the implement dealership which we are part owners of, we do all of our mechanical and maintenance work. Almost all pieces of our equipment have had some sort of modification which we feel makes them work better, and we do all of that work, too. . . . We were the first ones to ever convey spuds on a conveyor. The first conveyor we had built for us. We kind of drew up what we wanted and took it to a company and had them build it for us. . . . We were in the spud cellar one day and we were having to keep stopping to shovel the dirt away from the conveyor. It was time consuming, so we sat down and, on a paper sack, designed the first dirt eliminator. We took that to the farm equipment company we were working with and talked them into building us one. With a few modifications, it worked beautifully. The implement company asked us if they could take it to the state fair to show it, and they sold three of them during the fair. Now, all spud cellars have them. (Seed potato, grain, and alfalfa farmer of 4500 acres)

Every year we try new things. We don't farm any year the same as we did the year before. What works, we incorporate into our system. (Potato, barley, wheat farmer of 7000 acres)

When you get a piece of equipment, before you can take it into the field you've got to remodel it so it will work and function the way you want it to. We are really adept at adapting equipment. (Diversified farmer of 1400 acres)

We were one of the first to have the self-unloading potato trucks. I was in Boise and saw one on a semi. So I bought all the parts while I was there and that winter we converted all our trucks over to self-unloading. Then a couple of years after that, we started seeing the equipment manufacturers coming out with them. . . . We just got through last year building a new plow, and this winter we've been working on a new design, a system that we pre-mark the fields and use a guiding system on the tractor which will pull the plow, the leveling device, the potato planter and the Dammer Dyker all in one operation. (Grain, potato, and alfalfa farmer of 4000 acres)

We have one hired man that should have been an engineer. He's really good at machinery design and making changes on our equipment. He's also good at looking at new things coming out and bringing things to our attention that we need. For example, we were the first in the area to use the self-unloading trucks. After seeing one in Seattle, we built one. (Potato, grain, and alfalfa farmer and cattleman of 4300 acres)

One of the other things that we do that is quite different is that we have what we call "big generators" right in the field, and we do all of our sorting right there in the field before the potatoes go to market or storage. (Potato, grain, and alfalfa farmer and cattleman of 5500 acres)

We develop a lot of our own equipment. Just about every piece of equipment we've got we've either modified or rebuilt or added to it to fit our particular circumstances. If I see something that somebody else has got that I think will make me money, I will copy it, but probably 90% of the innovations that we have in our equipment we have developed,

seeing a need and then developing some way to meet that need. (Potato and barley farmer of 2450 acres)

(Regarding a tractor guiding system which he had designed) Well, I saw some in some shows and from some other farmers, and I modeled it after those. In this one, you turn the tractor around at the end of the rows, and the guiding system lines up and drives the tractor so that there are no mistakes. I've eliminated human driving error. (Diversified farmer and cattleman of 6600 acres)

We're always doing experimenting on our farm. We experiment with different pieces of machinery, different techniques, different varieties. These are very time consuming. Not just in the experiments themselves, but to keep track of them to see if they are any better than what you are already doing takes a lot of time. But, if you want to improve, you've got to keep doing things like that. (Wheat, barley, and potato farmer of 8000 acres)

Comments similar to the preceding came from nearly all of the farmers. Nearly all were very excited about the innovations and self-experimentation they were involved with, but a few commented on the fact that all self-experimentation did not meet with success. One such comment from the 31 year old son in a father/son partnership of 1300 acres was typical of this feeling. "We try several different experimental plots within our fields with grain each year. 'Experimental plots' is a glorified term for the mistakes you make. You make a lot of mistakes for every thing you find that works."

Self-experimentation and research on an individual basis were common to all of the farmers. However, many farmers were also involved with private or government sponsored research groups. These research groups included university research stations, Wheat Commission, Barley Commission, fertilizer companies, chemical companies, and other private research groups. Private research groups made up the largest sector with which these farmers were involved. Generally, the farmers' involvement was in providing areas of their farm for testing seed varieties, fertilizer types or application methods, or different chemicals. Involvement ranged from very limited, in which the farmers solely provided ground for the research, to a much more active involvement by the farmers. Several farmers sponsored field days on their farms where research results were set forth.

All of the farmers involved in this type of research reported it to be of great value to them as a source of information. The benefits basically came from two areas. The first was from the information and data gathered from the research through the different tests. The second area, which many felt provided the greatest benefit, came from the association the farmers had with the researchers and others on the cutting edge of

technology. Listed below are a number of comments representative of the learning obtained from agency sponsored research.

I'll allow different researchers, university people, as well as commercial people to put different test plots on my place. I watch those plots throughout the year and they are a really valuable source of information because I get to see them firsthand and evaluate them. (Potato, barley, and wheat farmer of 2000 acres)

I've had programs doing experiments with the University of Idaho people. I get them down here and then I pick their brains. I've had different researchers putting in these plots. I'm not so interested in the variety trials as I am in talking to the individuals finding out what's new in the market--what they recommend. If I've got a problem, I take them down and say, "Hey, what's going on?" I pick their brain to death. (Potato, peas, barley, and wheat farmer of 1400 acres)

We are currently working with a chemical company and a private company in California in developing a seed potato here on our place which is insect resistant. Potato beetles don't like it, and it's resistant to leaf roll. It'll be exciting when those things come out. (Potato, seed peas, oats, barley, and alfalfa farmer of 5000 acres)

We work very closely with private plant researchers in bringing their products to the farm for further testing. We set up contracts with plant geneticists to do their testing for them. They give us the varieties, and we watch them and keep records about what's good and bad about all of them. That way, we are the first to get any information. (Potato, grain, alfalfa farmer and cattleman of 7200 acres)

I'll allow anyone who wants to--researchers, companies, or anyone else who wants to--to come onto my farm and try something on a small scale basis and see if it works. And, if

it does, I'll implement it. (Potato, grain, alfalfa farmer and dairyman of 3200 acres)

Some of our biggest changes in our farming practices over the last few years have been in the area of fertilizer and chemical practices. We have worked very closely with the fertilizer dealers and chemical dealers, and have experimented with these companies in trying new things, and have been instrumental in getting some new chemicals cleared for use. (Seed potato, barley, wheat, and alfalfa farmer of 4500 acres)

We cooperate with the University of Idaho in putting seed plots on our farm, and we're kind of unique in that they send us a summary and we keep a record of what they do and what they don't do, and we use this information in helping us decide what we are going to try to do. (Potato, grain, and alfalfa farmer of 7000 acres)

Information Source Ratings

During the course of the interviews, each farmer was asked to rate the information sources that were listed on the interview form according to the perceived value for gaining new information for their particular operation, and according to their frequency of use since 1980. The 20 information sources listed were to be rated on a scale from 1 to 9; with 1 being "Of Little Value" and 9 being "Of Much Value." An example of the rating form is provided in the interview form (See Appendix D).

The averages of the combined farmer's ratings were calculated and the data is shown in Table 6. They are listed in the order of their value as

perceived by the farmers. "Other Farmers" was rated as the number one source for receiving information, followed by "Commercial Companies", "Neighbors and Friends", "Production Organizations", "Farm Magazines and Journals", "Landgrant College Personnel" (including the Research Station), and "Consultants". Each of these received a rating of 6 or above. This ranking corresponds closely to information presented in previous reports.

Table 6. Rating Of Information Sources (1=Little Value, 9=Much Value)

Information Source	Average Rating
Other Farmers	8.7
Commercial Companies	7.9
Neighbors and Friends	7.5
Production Organizations	7.0
Farm Magazines and Journals	6.8
Landgrant College Personnel	6.7
Consultants	6.1
Agriculture Bulletins	5.7
Extension Agents	5.3
Relatives	4.9
Newspapers	4.3
SCS	3.9
ASCS	3.9
Social Organizations	3.7
Coffee Shops	3.7
Radio	3.7
Television	3.1
Vocational Ag Teachers	3.1
Financial Institutions/Banks	2.7
Farmers Home Administration	1.2

When asked to identify their number one source for obtaining new information, most farmers had difficulty pinpointing the one source which they felt was of the greatest value because they used so many sources, and depending upon what information they were trying to obtain, their "most valuable" source varied. A typical response was made by a 54 year old farmer of 3700 acres who said, "My most valuable source of information? I can't say it's just one. It depends upon my need. I have a large network of sources and, depending upon my needs, I contact the source that can best help me." In like manner, the most valuable source varied from farmer to farmer, depending upon his needs, interests, and methods with which he felt most comfortable. The four sources most commonly selected were "Other Farmers", "Consultants", "Farm Magazines and Journals", and "Research Institutions". Following are some comments from the farmers which show the variety of sources considered to be the number one source for new information.

My most valuable source of information is other growers and private researchers. I also learn a lot through the farm organizations I belong to. (48 year old farmer of 2000 acres)

If I had to rank the number one source of information, I'd say it was my association with other producers. (47 year old farmer of 1200 acres)

If I were to categorize sources where I receive information, I would have to say 50% farmer network, 25% what you read, and 25% your own ideas. The farmer network is about as good a communication network as there is. (44 year old farmer of 8500 acres)

I would rank my consultant as the number one information source for keeping us informed. (58 year old farmer of 6700 acres)

The number one way I get new ideas is from magazines I read, with short schools being probably the second best source and other farmers ranking third. (28 year old farmer of 1600 acres)

Most of my information comes from farm magazines. The second most important source is probably from talking to other farmers and, I guess, the third source is from talking to the different dealers that serve us. (40 year old farmer of 1600 acres)

My most valuable source for getting new information is from books. I don't know what I would have done without books. No matter how many other sources I use, whether I use consultants or whatever, you still need to get a lot of your information out of books. (54 year old farmer of 4300 acres)

There are a lot of valuable sources, but I think my most valuable source is research personnel and my own personal research. I really like to watch the plots firsthand and evaluate them. I can get a lot of information that way. (59 year old farmer of 1400 acres)

My most valuable source of information that I use more than anything else would be college personnel and the extension service. (49 year old farmer of 1300 acres)

Fertilizer companies and other companies. They're as important to us as anybody. (40 year old farmer of 4000 acres)

New Technology Adoptions

In the course of the study, two quite recent innovations were selected to track in determining how many farmers within the sample had adopted the new technology and how those adopters had gained information pertaining to the innovation. The two selected items were computers and cellular/mobile telephones. These items were selected because they represent new innovations which are highly developed with proven technology yet have not been universally adopted nor has there been any mandated pressure to adopt these technologies. Both items offer potential advantages from their adoption and use, yet neither are essential to effective farming. Another reason for selecting these items was that the technology applies equally to varied aspects of farming.

Computers

In this computer age, the microcomputer will have an increasingly important impact on the structure of agriculture. Currently, microcomputer applications for the farm are of two types. The first provides production control (for example; irrigation scheduling, crop monitoring, animal-feeding systems, and machinery control) which facilitates labor-saving activities. Functions which were previously

performed by human labor are now carried out by the computer. The second application enhances managerial tasks (for example: record keeping, budgeting, production planning, crop forecasting, and marketing). Here the computer is used by farm managers to improve their decision-making power by allowing the farmer to gather information faster to help him/her in the decision making process.

When asked, 49 of the 50 farmers in the study said they owned a computer. A few of the farmers stated that they had a computer but as yet had not incorporated farm applications into their computer use. This was usually due to a lack of training in computer operation or knowledge of applicable software, and most stated that they were planning on implementing the computer in their farming operations. However, most of the farmers stated that they used their computers on their farms; some used them for a limited number of applications, but others used them extensively with constant updating and finding of new applications. The following statements provide an insight into the value the farmers placed in their computers and the variety of applications the farmers had found for their computers.

In my farm operation, I'm on my third computer. I started out with computers in 1979 when personal computers first came out. I acquired one of the first little finance programs

which I ran for about 2 years. I've updated twice because I find that I need more memory and more capabilities because I'm expanding my application use on the computer. I've done an awful lot of research in ag software, and at this point in time, we're using a software program that is very flexible and can be tailored and adapted to our own needs. . . . It's got a finance part, a planner, budgeting and payroll system, and it has enterprise overhead accounting that makes it very easy to allocate expenses to any particular enterprise. My computer is the most valuable source of information that I have. Well, I guess--me. I'm the one that puts the information into the computer, but it puts it together for me. (67 year old farmer of 2500 acres)

We bought our first computer just after they came out and we just bought a new one a week ago. We have a total of six computers on our farm now. We've changed our management procedures quite a little bit, and we keep all our records on the computers now. We used to be like 95% of the rest of the farmers where you keep all your information in a shoe box until the end of the year. We can't do that anymore--we've got too big. (28 year old farmer of 5300 acres)

I have a computer and I use it in my dairy every day. We do everything on the computer. Every cow we got, when we doctor it, every expense. Computers are good, but they're a little slow. (31 year old dairy farmer with 1000 cows)

I have a computer at home, but I don't use it on the farm. I hate the computer, but I'll probably have to get one. It's getting impossible to run a farm without one. The accountant has to have a computer, the banker has to have a computer printout. It's getting so that everybody has to have a computer printout before you can work with them anymore. (44 year old farmer of 1000 acres)

I use the computer a lot. Every two years I buy a new one because the industry is changing so fast that I don't want to get out of date. I use it for management and financial

decisions and about 10% word processing. (28 year old farmer of 1600 acres)

We own a computer, but we only use it to keep books and write checks. We don't use it for management decisions. We don't know how to use it and don't feel we have the time to learn how to use it. I don't feel it can do anything that we can't do. (56 year old farmer of 1400 acres)

The biggest thing the computer does for me is let me know where I'm at all the time. It's constant--it's there, and this is something I didn't have before. The computer is really a benefit. (54 year old farmer of 4300 acres).

One particular 67 year old potato and barley farmer was very innovative in an application which he found for his computer. He stated:

All of our fertility records for the past seven years have been stored in the computer. We make charts that we print out every week showing the soil samples and petiole samples, and we graph and follow the curves. We established desired levels of fertility for each field for each nutrient and we noticed a pattern for fertilizer needs. The last two or three years, we have been able to predict the nutrient requirements of our crops a week or two ahead of time, so we are a week or two ahead of the needs of the plants rather than being a week or two behind. Now, our tissue sample reports are used to verify the needs rather than report the needs. As far as I know, no one else has ever done this, and we have the highest potato yield per acre that I know about. I got the idea for this from a researcher who does research for a chemical company. He said, "It would be nice if we could predict the nutrient needs for the plants before they needed them, but we can't." This got me to thinking about a way that I could do just that. I think we have increased the yield of our potatoes 15-20% just with this one practice.

Prior to their initial investment in computer equipment, most of the farmers used several different sources in their quest for information regarding computers. Before they invested in computers, the farmers wanted to know about different types of computers, what the computer could do for them, and what software was available to operate on the computer they chose. The farmers seemed to be most influenced in their choice of a brand by current computer users and by computer vendors. Nearly all of the farmers purchased their computer before they had learned to operate it, but they felt that it was important to their farming operation to have a computer and that purchasing the equipment was the first step.

Most farmers were very self-directed in their search for information regarding computer operation, taking upon themselves the responsibility for planning, carrying out, and evaluating the learning. The farmers used many different sources to obtain information, including college courses, computer vendors, computer consultants, other computer users, and reading material. Many considered themselves to be self-taught with regards to computer operation, and several felt that they had made mistakes along the way and had had some difficulty in finding accurate information which they could understand and use. Following are several

comments regarding the farmer's pursuit for information about computer equipment and operation.

When I was in college I took computers. When we were ready to buy a computer, my wife and I took a computer class in town and after the class we went to the teacher and asked him to help us pick out a computer. He made suggestions and recommendations . . . and then we went shopping. The teacher went with us and helped us pick it out. (Owner of 1 computer, course instructed operator)

I first heard about computers through an affiliation that I had with other people in my church. This person sold computers and I bought my first two computers from him. As far as farming was concerned, I couldn't do a lot with them. I went through a 2 year period and got nothing out of them. I got talking with someone who was really knowledgeable about computers and had a computer, so I bought my third computer and programs from his recommendations. But it was so hard to use and so complicated, so we ended up just using pieces of its capability. Now, I've just bought our fourth computer. The programs are much simpler and we get along fairly well with it. But still, I'm not where I want to be. I'm currently working with a guy in San Francisco, where we are trying to gather things together to develop a computer program that will give me the things that I want and need on the farm. We're trying to make this program very user friendly and something that other farmers could possibly want to gain access to, also. (Owner of 2 computers [fourth up-date], self-taught operator)

We own a computer, but my wife's the one who runs the computer and keeps all the records. She learned how to do this from buying books and reading them. I consider her to be a self-taught expert, and she's one of the best. (Owner of 3 computers, self-taught operator)

We learned how to run the computer out of books, we never did take a class. Maybe we should have--it probably would have made things a lot easier. But it's hard to find a class that can meet the times when you have time and teach what you need to learn. Not only that, but you usually want the information faster than that, so I learned just late nights reading the books. (Owner of 4 computers [fifth up-date] , self-taught operator)

We have a computer and we basically learned how to use it by taking classes at the local college, through hours of making mistakes, and figuring out how to overcome our problems, and I think we finally have a handle on it. My wife also went to a school in Oregon and one in Montana to learn how to operate the software that we're using. This has been a difficult thing because at our age [60 -61] these kind of things don't come easy. (Owner of 3 computers [third up-date], course instruction and self-taught operator)

When I bought my computer, I went around and asked everyone, and they all said to buy an IBM compatible, so I decided that IBM must be the best, so I bought one. The software we purchased was basically from talking with the dealers and our learning about the software is by going back to the names of the "help" people given to us from the software dealer and from the original dealer we dealt with when buying the computer. (Owner of 2 computers, self-taught operator)

I learned how to run a computer on my own. I just had the salesman come out and talk to me about it. I ended up buying one, and I read the manuals and just learned how to run the thing. I keep almost all of my farm records myself on that computer. But, with as much information as I'm processing through the computer, I'm going to have to get me some help. (Owner of 2 computers [fourth up-date], self-taught computer operator)

We have several different computers on our farm. How we first got into them was that I heard about computers and what

they were doing and I knew that I just had to have one. So I went out and bought me one and I bought some programs, but they never worked. We bought the wrong computer to start with, we had to go buy a different one. Then I started contacting other individuals who had programs available for farm programs that I was told would work, but they wouldn't work very well either. Finally, I got ahold of an individual who wrote and sells a software package written just for farmers, and it is excellent. He works by himself, and he drops by whenever I need him and whenever there is an update in the software he comes out. (Owner of 2 computers, self-taught computer operator)

As mentioned previously, there was one farmer who had not purchased a computer. This 57 year old farmer of 1500 acres had the following comment to make regarding computers.

We've kind of held back from buying a computer because we've felt comfortable in keeping our records the way we have, and I've never convinced myself that I could keep track better with a computer than I can with what I'm doing. It may take me a little longer, but I can come up with any information that I might need. But, I can see that computers are the future and I have the feeling that if I don't get in there and learn how to operate the computer and become knowledgeable about how the computer works, I'm going to be left behind.

Cellular/Mobile Telephones

Mobile telephones have been available for quite some time, and just recently there has been a vast improvement in the technology of this communication system. To determine the farmers' use and view of

mobile telephones, they were asked if they had purchased and were currently using cellular/mobile telephones. Forty-eight of the 50 farmers interviewed had purchased mobile telephones. All found them to be of great value and expressed this through comments such as "I don't know how I got along without it, it saves so much time" or "The phone is one of my most valuable tools." A number of quotations from the interviews are listed below. It was difficult to limit the number of comments in this instance because each farmer was so committed to the use of this technology.

Yes, I have three car phones. I couldn't run without them. The car phone allows me to utilize my time when I'm driving. They give me the link I need to all my customers and suppliers as well as the rest of the world. (48 year old farmer of 2000 acres)

The car phone paid for itself the first month. It allows us to contact not only each other but our suppliers and other people we work with, no matter where we are. It's especially good for chasing parts when making repairs. (54 year old farmer of 4300 acres)

As a farm manager and owner, I find that I'm a manager of the resources under me--human, natural and other. I find I spend a lot of my time in the truck going from problem to problem. The mobile phone gives me access to all areas of the farm where decisions can be made faster and we can get the problems taken care of. The phone allows me access to those I want to contact around this area and elsewhere. It also allows my wife and family to get ahold of me in

emergencies. It's my office away from home. (47 year old farmer of 4200 acres)

The car phone has really increased productivity. We have four car phones and 28 two-way radios. We can check on our employees and see what they are doing, we can take care of emergencies faster. Communication is the key to a successful operation, and these telephones and radios allow us to communicate wherever we are. (50 year old farmer of 4500 acres)

I have a car phone. It's of tremendous value to me. As I'm going down the road and I'm thinking, I can make a phone call right then and there. We're spread out and I spend a lot of time on the road traveling. It allows me to order parts or call and get information right where I am instead of waiting until I get back by a phone. It helps me with buying and selling. (40 year old farmer of 5500 acres)

The problem with a car phone is that we can't get away from anybody. But, it does save a lot of time and it does allow us to use our time to advantage as we're driving which, otherwise would be basically wasted. Most everyone I deal with has a car phone now. When I need someone to get ahold of me, I give them my mobile phone number and they can reach me without my having to stay close to the phones like I used to. Another reason a car phone benefits us so much is that our farms are so spread out. We can communicate with each other, and when we need something, we can call and get it coming without having to stop everything and running into town. (42 year old farmer of 1800 acres)

I use the car phone for so many things. I had a hard time buying the phone because I didn't want to appear to be boastful at all thinking that I was on some kind of ego trip. In fact, I've tried to figure out a way to cut off the antenna so no one would know I had it. But the phone is a valuable tool that has increased our efficiency and I use it all the time. (38 year old farmer of 1700 acres)

The only thing that I can think of that's more valuable to me than my car phone is my pockets. I don't know how I got along without it. It's the greatest time saving device I've ever had. (44 year old farmer of 1000 acres)

Most of the farmers learned about mobile telephones from advertisements or from seeing someone who had one. Almost immediately the farmers recognized the value of this innovation and moved quite quickly to obtain one. The information necessary for operating the telephone was minimal and was generally obtained from the telephone distributor from whom the farmer bought his equipment.

Many of the farmers were among the first in the area to use mobile telephones. One particular 50 year old farmer became involved with mobile telephones before the commercial service was even available in Idaho. He stated:

We realized when we first heard about the portable telephones that we had to have one. We tried all over to figure out how to get one, but no one could get us one, so we had to go out of state. To use it, we had to build our own antennas and everything.

Learning Outside of Agriculture

It is difficult to distinguish between learning that took place to enhance the farmer's occupation and learning for other aspects of the

farmer's life because, for each of these farmers, his farm, his family, and his leisure time were so intertwined. As mentioned previously, farmers do not work an 8 hour day but are tied almost constantly to their occupation.

However, the interviews brought out that these farmers were involved in learning separate from farming and agriculture. Their quest for learning new information applied not only to their farms but to non-farming activities as well. These farmers were involved in such diversified areas as karate, art guild, community music presentations, time management seminars, airplane building, religious investigations, leadership conferences, nature and environment studies, political interests, the study of law, scouting, sports, and rebuilding antique cars and tractors. These farmers were heavily involved in gaining information for their special interests, and each farmer was very different in the interests he pursued. The information sources for this type of learning were very similar to those used in their farming endeavors; namely, short course training, talking to others, asking questions of those in the field, and reading. Their learning methods were self-planned and very self-directed. A selection of quotations from the farmers illustrate the variety of

learning activities entered into by the farmers, and some of their methods for pursuing information regarding these endeavors.

Other than farming, I enjoy rebuilding old cars. In fact, I'm going to work on one tonight Our kids are both in scouts and we are involved in helping them build their pinewood derbys. This is my fifth one Just recently, I learned how to reload [rifle shells] so it didn't cost me so much to shoot my gun I do a lot of golfing, and in the winter we do a lot of snow machining. We own about eight different sleds and we bring other sleds in and repair them for others to help pass the time in the winter. It's turned out to be a pretty good business. We even have some of the local snow machine dealers in town bring us their machines that need to be repaired. (Part owner of implement dealership, fertilizer plant, and grain elevator, and farmer of 2500 acres)

One of the things that I do that's not in the area of agriculture is restore old farm machinery as a hobby. I have about 50 pieces of farm machinery that I've restored in the last few years. I've had to do a lot of research just to restore these. The best way I learn about these is from reading books. I also just took a machinist/metal working class to learn how to work the lathe which is something I've always wanted to do. (Father/son partnership of 4300 acres)

I built myself an airplane in my shop last year. I visited a lot of people and read a lot and designed and built the airplane. I also go to operas and that is certainly a learning experience. (M.S. in communications, owner of manufacturing business, and farmer of 8500 acres)

I'm involved in a lot of other projects besides those associated with farming. I sit on the school board and I'm involved in an estate planning class at this time. I also take part in a "Know Your Religion" series which meets once a month, and I read and study the scriptures every day. (Leader within his church and community, and farmer of 1400 acres)

One of the things that I've learned lately was Spanish. I took some night courses as well as learned it from those I work with on a daily basis. The problem with just learning at work was that it was taking too long. (M.S. in education, former teacher, and farmer of 7000 acres)

I'm a county commissioner and I'm very involved with county planning and program development and administering. I'm also on the school board and we are always looking and studying something to try to improve our educational system. (Leader within his church and community, and farmer of 1800 acres)

I sing in the community choir. This is a new experience. I've never sung in a choir before. I also serve on the church board and teach the gospel class each week which takes quite a few hours each week to prepare for. (Doctorate in philosophy, member of church board, and farmer of 3400 acres)

I don't think our time is utilized at 100% of what we could be doing to learn. Other than farming, I'm involved in the National Guard. I've got 19 years now in the guard. I also love to ski. I cross country and downhill ski. I'm also involved in scouting, both on the local level as a scoutmaster and with the council. (Part owner of potato processing plant, and farmer of 1800 acres)

I feel like the whole world is an encyclopedia if we just open it and look at it. There is so much out there that we can learn. Not just about agriculture, but about life and how we can become a better people. I went to a meeting just last night on pheasant habitat. I learned an awful lot last night that I didn't know. (Owner of a gun shop and customizing truck business, and farmer of 1000 acres)

Travel for Information

During the course of the interviews, it was of significance to note the distance the farmers traveled to see some new technology or obtain information. Distance did not seem to be a factor when it came to the importance of learning something new that might help the farmer with his farming operation. In their quest for additional information and in their desire to observe new technologies, practices, or equipment, the farmers traveled extensively. Much of this travel was local, but a great deal was to other parts of the United States as well as outside of the country, including England, Russia, China, Puerto Rico, Mexico, Japan, Israel, and Canada.

Much of the travel was independent of other association, but much was also in connection with some organization or association to which the farmers belonged. Some comments that indicate the amount of travel entered into by the farmers and the value that came from this activity follow.

I try to go on the road at least once a month to visit other dairies. I visit about half a dozen a day and talk to the managers and the owners and find out information. I talk to them about feed, management decisions, and things like that. This is probably the number one way of learning new things for me. It's good to go on the road and see what other people are doing. You can kind of get in a rut and do the same

things day after day. (Farmer of 1000 acres and 460 cow dairy)

We've helped develop a way of sorting foreign materials out of potatoes. The medium we use for that is sand. We call it the sand machine. We got the idea when we were in Israel where we saw a sand separator. (Potato and grain farmer of 3800 acres)

I do a lot of traveling. We went to Mexico, Puerto Rico, and all over the United States. I did this with the cooperative board to learn the other side of how to sell merchandise. I've really picked up a lot of stuff there [cooperative board]. They give talks about new items coming out and what a benefit they would be for the farmer which helped me make decisions when I got home to use these things. Wherever I go, I talk to farmers--from Canada or wherever. I've talked to Christmas tree farmers, hayseed farmers, bean seed farmers. You start talking to them about what they do. One little thing that they do, we'll pick up something from them and it will spark an interest and when we get home, we'll try it. It helps you realize that even though you've been to college, learning is something that is taking place all the time. (Alfalfa, and grain farmer and cattleman of 7700 acres)

I'm one of the directors of the Idaho Crop Improvement Association for which I travel all over the state. By meeting with the different members of the association all over the state and discussing crop improvement, I learn an awful lot. It's a great source of information for me in running my own farm. Even though this association is a service type of organization, it's very valuable to me. (Potato, grain, and alfalfa farmer and cattleman of 5500 acres)

We try to take advantage of any schools or factory sponsored trips where they send us back to the factory--like John Deere and Lockwood. And there's a lot of good information you can get just by traveling outside the area. We try to go once or twice a year back to the mid-west. Last year we went to

North Dakota and Wisconsin and visited with farmers there.
(Potato and grain farmer of 8500 acres)

We sell potato seed into California, and we go down and look at their crops. This past year we went down at harvest and watched them harvest not only potatoes but five other crops at the same time. We learn a lot from traveling and visiting other farmers and seeing harvesting techniques, not only with potatoes, but with other crops as well Last year we went to Europe looking at farm machinery at different farms and how they did things there. When we were traveling in Holland, we saw the most efficient potato warehouse we have ever seen. (Potato, grain, and alfalfa farmer of 4500 acres)

I work with one of the researchers for Frito Lay whose station is research international. He works with people all over the world with different problems. He was in Brazil working with producers there with their problems and he sent a farmer from Brazil up to our place to see how we were solving our problems. I worked with this man from Brazil for three months. (Potato, grain, and alfalfa farmer and cattleman of 2800 acres)

When we went to buy a new drill, we spent a couple of days traveling around talking to other farmers and dealers about drills and we got some information on a new drill that seemed to be what we wanted in Canada, so we drove to Canada to take a look at it. (Grain and alfalfa farmer of 1300 acres)

Obstacles to Learning

In seeking out information, most of the farmers commented that it is sometimes very difficult to find a good, informative, and reliable source. They generally had to sort through a great deal of material in order to find information that was valuable, worth keeping, and in a usable form.

One farmer who has his bachelors degree and who farms 5300 acres expressed his feelings this way.

We need a way we can get information faster without doing all the sorting and work to get it. It takes a lot of our time to keep informed. Progress is one of those things where it is hard to get the right information. Sometimes you think you have it, and you're wrong.

Most farmers perceived that even though it was difficult and took a great amount of time to obtain information and learn about new technologies, they had an extensive enough information network to hear about new technologies and innovations very soon after they had been developed. However, when asked about a specific technology that other farmers were using, in several cases the farmers were not aware that the particular technology had been developed. As a case in point, one 54 year old potato, wheat, barley, and alfalfa farmer said that he felt that he would hear about a new idea within a month after it had been introduced on the market if it were of value to him. However, when asked about a specific chemical that had been on the market for about 2 years that would be of value to him, he said that he had never heard about it. Another example related to computer use where many farmers were struggling with their

software, thinking something better did not exist when other farmers were using software that would accommodate their operation very well.

One of the obstacles to learning arose from the vast amount of written material available. The farmers listed this as one of their most valuable sources for obtaining new information and ideas, yet the vast quantity of written material was an almost overwhelming barrier for many of the farmers. Obstacles included that sorting through the written material proved very time consuming to these farmers, much of the material proved too general or basic and did not provide specific information, much of the information was already out of date by the time it was printed, and many mistakes and contradictions were found in different written sources which made it difficult for the farmers to determine what to believe.

The farmers acknowledged the fact that even though business representatives were a big help in obtaining information, they could also be a non-reliable source for information as well. The farmers repeated over and over that it was not easy finding the right representative with which to work--one who could provide the service and knowledge necessary to go along with the product. Another barrier to obtaining good information from company representatives was the inability to

communicate. Some highly educated, knowledgeable representatives could not speak in terms the farmer understood. There was a natural language barrier that limited the transfer of information. One farmer who holds a bachelors degree and who farms 1200 acres made the following comment.

I haven't been satisfied with the computer places that sell computers in getting information from them. Everytime I went in, they'd talk way above my head. So, I bought my computer from an independent fellow who works with computers all the time and who I could understand.

Most of the farmers participated in on-farm experimentation through test plots and through experimenting with new equipment, seed varieties, chemicals, and farming methods. All of the farmers expressed that experimentation was a valuable source for obtaining new information, but many of them also expressed concern over the time, uncertainty, and expense associated with experimenting. In the case of test plots or new variety trials, years were sometimes required to test and validate results. In using new equipment, many modifications generally were required to adapt the equipment to each farmer's conditions. Farming methods did not always work out as expected, and some innovations which had proven effective on other farms proved unsuccessful. All of these situations created problems for the farmers, but few allowed them to become real

barriers. Sometimes their experimentations were more limited than they would have liked, but most of the farmers still participated in this type of learning activity. One comment which expresses the farmers' concerns with experimentation follows.

We're always doing experimenting on our farm. We experiment with different pieces of machinery, different techniques, different varieties. These are very time consuming. Not just in the experiments themselves, but to keep track of them to see if they are any better than what you are already doing takes a lot of time. But, if you want to improve, you've got to keep doing things like that. (Potato and grain farmer of 8000 acres)

Preferred Methods for Gaining Information

When the farmers discussed their preferred method for receiving new information, it was really determined by what information they were seeking. For example, the farmers used different methods when they were seeking information about mechanical repairs than they used when they were seeking information about farming practices. The farmers were very self-directed in selecting methods which they felt would accommodate their needs, and all used a variety of methods.

There was no method which stood out as a clear favorite or as the one of most value. However, several distinct categories did emerge. The

interviewed farmers tended to prefer methods in which discussion could take place, usually in a one-on-one association or in small groups. They also preferred "hands-on" experience or demonstrations. Most of the farmers mentioned that one of their most reliable sources for information was from other farmers who had adopted new technologies and were willing to share their knowledge. A preferred method of learning was visiting with other progressive farmers or going on farm tours to observe what was being done. Learn-at-home, self-study, and reading were listed by some as being their favorite methods because they could select the time and materials studied. Short course study was listed by others as their preferred method, in which a specific topic was discussed by experts in the field. To demonstrate the diversity of the preferred learning methods among the farmers, several quotes are included below.

I like to learn by "hands-on" methods. I like to hear what other people are doing, too. I also like to read, because in reading you can always go back and check what they've said three times. (B.S. in ag economics, and farmer of 900 acres)

The method I like to learn the most from and that is just now coming of age is by video. I like to watch videos I just came back from Wisconsin where the Case dealer sent me to some special schools and to tour their factories. During those schools I picked up some videos and brought them home with me on how to properly set up and adjust my combine. Just being back to the factory to see how the combine was built

was a learning process. (Owner of construction company, and farmer of 4000 acres)

The method and circumstance where I like to learn the most is in a one-on-one where I can ask questions and can get answers on a person-to-person basis. (High school graduate, farmer of 1200 acres and 170 cow dairy)

I like to see and ask questions on a personal basis. I like to learn that way. (Bachelors degree in business, owner of trucking business, and farmer of 4300 acres)

I prefer learning by going and taking a class to try to make the most of my time. I can try a long time to learn on my own and still not get it. I need to have things demonstrated to me and have someone I can ask questions of. (Part owner of grain elevator, implement dealership, and fertilizer company, and farmer of 2500 acres)

The method I prefer to learn by is from someone who has tried something, had some experience, and then I'd like to go see it and ask questions. I like short courses, seminars where there's a lot of feedback and questions that can be asked. (Bachelors degree in animal science, owner of potato seed company, and farmer of 5500 acres)

The method I like to use to learn is probably reading. I wish we had some way of gaining information while sitting on the tractor. I listen to the radio, but I don't get much information from the radio, and if we had some way of gaining information while sitting on the tractor, it'd sure be a big benefit. (Owner of custom farming operation, and farmer of 600 acres)

I sponsor field days at my farm. I invite other farmers, dealers, county extension people, as well as myself to present information, and I invite anyone who wants to come. The purpose is to teach and learn more about farming. I would do anything in my power to learn because information is the key to my success and the key to the future. (Owner of grain

elevator, trucking company, fertilizer company, and farmer of 40,000 acres)

Summary

The preceding chapter has presented findings based on the analysis of the interviews conducted with 50 selected progressive farmers from 10 counties in Southeastern Idaho. The major findings to emerge from the interviews were that farmers of today do overcome barriers and obstacles to engage in learning and opt for increasing present knowledge, gaining new skills, promoting changes, and adopting new innovations. These farmers were constantly searching for new information, putting themselves in positions where they would hear about new things. They were on the lookout for new ideas. When the farmers had a problem or a need, they set out to find ways to solve these problems.

The methods and sources used to obtain the needed information were many and varied, depending upon the individual and the information sought. These farmers seemed to be true information seekers with each farmer using not just one or two sources to receive information but employing many sources. Of these sources, other farmers, commercial companies, neighbors and friends, production organizations, farm

magazines and journals, land grant college personnel, and consultants were named by the farmers as being of most value or used most often.

These farmers seemed to be self-directed in their learning activities, overcoming many obstacles to keep informed. Farmers preferred learning in non-traditional ways, favoring methods of learning where discussion could take place with experts and generally in a one-on-one or small group situation. The farmers also preferred "hands-on" demonstrations, learn-at-home materials, and short courses.

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

The purpose of the study, related theory and research, methodology, and findings from the research have been presented and discussed in the previous chapters. This chapter will briefly summarize the preceding four chapters and will present conclusions and recommendations relative to farmer learning and to future research.

Overview

In this world of constant change, some of the most significant changes essential to the survival of mankind have taken place in the area of agriculture. Farming methods, equipment, and plant varieties have become obsolete at an accelerated pace as new and better alternatives have been developed to increase production and preserve the precious resources available. These rapid changes in farming practices due to new innovations have important practical implications for farmers.

Because of the many changes that affect him, learning is a continual process among farmers. In this information age, the progressive farmer's

methods and ability to obtain, organize, store, retrieve, and transmit information are also changing.

Farmers are bombarded with information from a variety of sources. They must continually evaluate this information as to its relevance, accuracy, and usefulness to them and their operation. The vast amount of information available forces farmers to be selective in terms of what they view as important and worth considering. It has become virtually impossible for them to assimilate all of the information available in the area of farming, and it can be costly to the farmer, both in terms of time and money, to seek information that has little application to his farming operation.

The findings of this study have been stated in the hope that they will lead to a better understanding of:

1. Where progressive farmers first receive information regarding new methods or innovations;
2. The sources used most by progressive farmers to obtain information about new innovations or methods;
3. The information source which is most relevant to the progressive farmers needs;

4. The methods most often used by progressive farmers in the learning process; and

5. The preferred methods progressive farmers use in gaining information.

In the probing for answers to these questions, other important information pertaining to farmer learning was gained as well.

Conclusions and Recommendations

A number of conclusions can be drawn based on the findings from this study of progressive farmers. Recommendations for improving facilitation of learning and for further research have been suggested where deemed appropriate in an effort to assist farmers and those involved with aiding farmer learning and in the hope that this study will be of benefit to those involved in agriculture.

1. Learning is an important part of society, is lifelong, and is an ever-changing process. This is true for those involved in farming as well.

Education does not take place only in a classroom situation or between the ages of 6 and 22, but rather it takes place in almost all situations and in places not formally recognized as learning areas. It is a

lifelong pursuit. When looking at continued learning throughout life, there are certain forces that act unitedly to expand awareness of the value of continued learning. These forces are the onslaught of occupational obsolescence, the pervasive change in lifestyles, and the value system that is a characteristic of the changing American society (Heimstra, 1976).

Due to the knowledge explosion and the amount of change that is so rapidly taking place in the agriculture industry, these forces have a very real impact on farmers. Progressive farmers emphasized that they were constantly learning and that it takes a continual effort to keep up-to-date. They seek information in all that they do, and they consider learning, keeping current with new technologies, and the ability to accept change and adopt new technologies an integral factor to their success, as they produce more food and fiber today on less land and with less physical involvement.

2. Progressive farmers seemed to be true information seekers, with each farmer using a multitude of sources to receive information.

Previous research has attempted to isolate the information source, or sources, most often used by farmers among the surveyed sample.

Crawford (1969), Stadlman (1973), Awa and Van Crowder (1978), Smith

(1980), Garoutte (1988), and Carlson and Guenther (1989) found that one of the most commonly used sources for receiving information was farm magazines. Awa and Van Crowder (1978) stated that Extension sources along with farm magazines were used most often. Garoutte's (1988) research indicated that the Department of Agriculture, farm magazines, and family and neighbors were selected as the most used sources. Matheson (1989) found other farmers to be the most used source for receiving information while Carlson and Guenther (1989) stated that the most commonly used sources were reading materials, company contacts, and other farmers.

Even though these studies did not deal with progressive farmers, they have given some good insight into where farmers obtain information. However, due to the rationalistic design of each of the above mentioned studies, responses of the farmers were limited to a quantitative answer to the questions asked and, as evidenced by the conflicting research conclusions, the results of this type of study varied depending upon the sample studied and the questions asked.

Though the participants of this research study were also asked to identify the source which they found to be of most value to them in obtaining new information, they were also given the chance to discuss the

merits of any sources which they used. Almost universally, the farmers stated that their number one source for obtaining new information depended upon their immediate needs and was determined to a great extent by the information being sought. It was very difficult for them to isolate one source to the exclusion of all others. Several of the farmers stated that they used so many sources, that there was no source which they could not do without. They felt that if they could not get the information from one source, there were other sources where they could get the information. The most valuable source varied from farmer to farmer. Many farmers stated one source as their most valuable source and then went on to expound on information they got elsewhere. This study indicated a high degree of importance placed upon other farmers, consultants, farm magazines and journals, research institutions, and commercial companies as sources for information. It is also evident that the farmers placed different degrees of reliability on different information sources.

Another observation was that these progressive farmers were constantly seeking out information in everything that they did. Even while recreating or visiting, they discussed their farms. Several said that some of their most valuable information came from thoughts and ideas

which were sparked from unexpected sources; information was all around them--all they had to do was look and listen. Therefore, in getting needed information to progressive farmers, it is recommended that the information be diffused through as many sources as possible. There is not one source that will reach all farmers.

Computer usage appeared to be an area especially lacking in terms of application of available information. Most of the farmers were attempting to utilize computers in their farming, yet many were struggling with clumsy software programs which were not adapted to their particular operations, and they did not know how to go about solving this problem. Most of the farmers had used self-study to gain their computer information because they could not find classes or information which seemed applicable. This resulted in much time loss and costly mistakes. However, other farmers in nearly identical circumstances had obtained computer programs which were extremely efficient and beneficial. It appears that, in this area, there is a great need for information regarding farming computer programs, their capabilities, and operating aids, and this information needs to be disseminated in sources that reach the farmers.

3. When progressive farmers became aware of a particular learning need, they were motivated to learn, to work harder, and to learn more. This resulted in a sense of enjoyment and achievement and they wanted to continue learning.

According to Abraham Maslow (1954), "motivation for behavior is basically need-meeting (p. 55)." Needs were viewed as a force that could be "aroused from within by internal visceral processes or from without by the effect on the person of the immediate situation (Clifford, 1981, p. 352)."

Research for this study indicated that the major emphasis for progressive farmer learning was need meeting. Since each farmer and his farm were different, each farmer had different needs and interests which were generated from the circumstances in which he found himself, and these needs then became the major relevant focus for the farmer and his learning endeavors. Many of the farmers commented that they read a great deal of material and were introduced to many new ideas. However, unless they could see an application in their farming operation or a solution to a problem which they were aware of, they would rarely investigate further to learn more. They were busy enough learning what was pertinent to their use, and they had no time for extraneous learning.

However, not all needs were farm related and a great deal of learning took place in the areas of recreation, sports, religion, community, and personal interests.

Organized learning activities with which these farmers preferred involving themselves were practical, hands-on courses (such as potato schools and mechanics courses) where practical and applied instruction was received rather than theoretical or academic learning. This, again, pointed to the fact that the farmers wanted to be able to apply their learning now and not file it for future reference only. Those involved in agricultural training programs may take this as a suggestion to make their information giving more immediately applicable and their instruction more hands-on rather than theoretical.

4. Progressive farmers are self-directed in many of their learning endeavors.

The progressive farmers took upon themselves the primary responsibility for planning, carrying out, and evaluating their learning activities. Farmers were active participants in learning and in change. Their learning activities varied and took place with or without the help of

others. It was often noted that these farmers had developed the ability to learn without being taught.

There were two basic reasons given by the farmers for their involvement in self-directed learning activities. Of primary importance to the farmers was their ability to be in control of their learning. One of the major advantages of self-directed learning is that it allows freedom to determine what is to be learned. It was important to these farmers to be able to direct their own lives and pursue learning in those areas in which they needed or wanted information.

The second reason given by the farmers for self-directed learning was that most traditional educational methods were too slow and the farmers wanted to be able to control their learning pace. Most learning focused on applied knowledge and little time was spent in theory. Most of the farmers felt that they could learn much more applicable knowledge in less time through self-directed activities.

There was no single method which stood out as a primary method in their self-directed learning. Even when seeking out similar types of information a variety of methods and sources were used by the farmers. However, the methods mentioned most often did fall into several distinct categories. Some farmers read while others preferred talking to other

farmers, consultants, or vendors, and some farmers learned through observation and trial and error. Whatever method they used, they felt that they were involved and were gaining information in the best way for their particular need.

Here again, computer learning was a good example of learning a new technology through self-direction. Even though some of the farmers did attend classes, most learned how to use the computer from aids obtained from vendors, other farmers, asking questions of computer specialists, reading manuals, or simple trial and error.

Self-directedness in learning was evident in all of the farmers and in most of their learning endeavors. It was also evident through the variety of sources and methods they employed.

5. The progressive farmers wanted to learn in the best way possible with regards to efficiency, ease, and value.

Past research has shown that interests, needs, and desires provide the energy which is the key for learning. Progressive farmers, like other adult learners, almost always show high interest in learning for immediate use. When the need, interest, and desire to learn were present and the

farmer was seeking information, he indicated that he wanted to use the fastest, easiest, and least expensive way he could to gather the information.

Along with the factor of cost the farmers seemed to recognize the value of service and reliability. Many farmers were willing to spend more money when the value was present. Though all were very conservative in their spending, money did not seem to be a barrier and they were willing to spend what they had to in order to get the information they wanted. Most farmers said they would rather buy from a dealer who was more knowledgeable and willing to help them, even if it cost them more money.

The interviews did support the idea that methods and sources were chosen on the basis of the expeditiousness and the ease with which the information could be obtained and the personal preferences of the farmer with learning strategies that had worked in the past. Though expense was listed by farmers as a factor, the interviews indicated value rather than cost to be the great factor affecting method choice.

6. Most of the farmers evaluated an innovation not on the basis of scientific research by experts but through the subjective evaluation of near-peers or other farmers who had adopted the innovation.

Previous research has indicated that when individuals share common meanings, beliefs, and a mutual language, communication between them is more likely to be effective. This finding was further verified by this study where the farmer-to-farmer communication network was shown to be one of the most efficient means for disseminating information. Not only did these farmers regularly visit other farmers to gain new information for themselves, but other farmers frequently came to them for information as well.

Progressive farmers not only considered other farmers to be one of the most used sources for obtaining information, but they indicated that other farmers were the most reliable source and the best guide for deciding to adopt or change a farm practice. If a neighboring farmer used a practice and found it successful, other farmers were much more likely to investigate the practice and adopt it. This view was expressed by one of the interviewed farmers who stated, "I guess I don't trust professional people because my first thought is, 'If it's so wonderful, why aren't you out there doing it?' I guess that's why I trust successful neighbors--people who are actually working with it."

Since progressive farmers indicated that the use of a practice by other farmers was one of the top indicators of whether or not they would

learn about or use a new practice, it would be useful for those involved in farmer education programs or in the adoption process to work more closely with individual farmers in promoting and developing improved technology and to offer more farm demonstrations and workshops involving growers as instructors. This would likely speed up the diffusion and learning process due to the farmers' perception of the validity of the information.

Another recommendation is the establishment of more farmer organized discussion groups where the farmers meet together on a regular basis to discuss problems and help each other. This type of learning involvement was used by several of the progressive farmers interviewed, and all expressed the feeling that it was a very valuable source of help to them.

7. The farmers spent a considerable amount of time reading, especially during the slack season, and all felt that the investment of their time in reading was valuable. However, all felt that there were problems associated with using written material as an information source.

The farmers made good use of slack time during the winter by reading and updating themselves. In view of the vast amount of reading

material available and the difficulty in keeping abreast with current reading material, many farmers commented on the difficulty of knowing what to read. It would be beneficial to farmers if articles could be summarized into an abstract or digest form so that they could determine the value of an article quickly and yet find more detailed information if they desired.

Another problem commented on by the farmers was that as an initial introduction to new innovations or practices, reading material was very often outdated by the time it was printed. Many articles are based on the culmination of years of research, and for the early adopter this is too slow a process. However, such information may still be new and of value to later adopters.

Because all of the progressive farmers placed such high value on reading, future research might focus on whether or not there is a disparity between the volume and the type of reading done by progressive farmers and that done by their unprogressive counterparts.

8. Short courses and schools were seen to be of great value to the farmers in keeping current and aware of new innovations. The most frequently attended schools were those sponsored by companies.

As reported in previous research and in the findings of this study, most farmers do not frequently use formal schooling for help in their learning endeavors. Even though the farmers reported a great need for learning due to the rapid changes taking place in agriculture, very few of them participated in traditional education.

However, farmers were frequently involved in clinics, short courses, seminars, or workshops sponsored by farm organizations and commercial companies and found to be of great value to the farmers in keeping them current and aware of new innovations. These short courses and schools were attended throughout the year, but the majority were attended during the winter or the farmer's slack time when they could best afford to be away from their farms. The most frequently attended schools were those sponsored by commercial companies with which the farmers worked.

Recommendations for those involved with assisting farmers in their learning process would be to encourage attendance at these short courses and allow for as much farmer involvement and input as possible. Because the farmers reported a major benefit from these courses to be the time spent in visiting with other farmers, interaction among farmers should be scheduled as part of these clinics and short courses. This would enhance

learning, allow problems and questions to be addressed, and reassure farmers that information presented is reliable and valuable.

9. Consultants were considered to be valuable sources of information in their areas of expertise and also in providing information about other farm practices occurring in the area.

The farmers used a variety of consultants including agronomists, fertilizer experts, irrigation experts, veterinarians, accountants, computer experts, and mechanics. Whenever the farmers needed the services of any of these experts, they not only asked for their assistance but they sought additional information to increase their knowledge base and to advance their learning.

Farmers considered consultants to be very valuable in the utilization of the latest techniques. However, information about other area farms which the consultants brought with them was also deemed to be of great value. Many of the farmers stated that this information about new innovations and practices used by neighbors was more valuable as a source of information than the specialized information which the consultants provided.

Most of the farmers stated that, even though they hired consultants, they still made the final decisions about whether or not to follow recommendations. However, the farmers still valued the information from the consultants and used them for a sounding board, for providing testing and laboratory results, for a second opinion, as well as for a source for new information and ideas.

10. Many of the farmers were involved in farmer organizations, and the more involved the more value they found the organizations to be.

Farmers stated that their greatest benefits from belonging to farm organizations came through their service to the organization. Those serving on boards or as officers found them to be of greater value than those who merely paid dues. A majority of the progressive farmers interviewed did serve in farmer organizations and did find them to be of great benefit. Specific benefits which came from their involvement included access to research proposals and test results, travel to different areas throughout the country and even worldwide to observe and study conditions and practices, meetings with other farmers and individuals involved in agriculture, and work with other farmers through the organizations.

It appears that there is a great deal of information available through farmer organizations, but this information is not reaching the general membership. Farmers might be benefited from greater availability of information regarding programs and research studies being sponsored by the various organizations.

11. Progressive farmers valued past education; yet, as previous research indicated, traditional education was not widely used in the adoption of innovations.

Findings from previous research in farmer learning indicated that farmers rarely become involved in traditional education in order to become more informed or to learn new skills. Though this finding was verified in this study, it is of interest to note that the interviewed farmers had obtained an average of 3.03 years of post-high school formal education, and all said that it had been of great value to them. However, the farmers stated that for the seeking of current information, they used sources other than formal education. The greatest value of traditional education, as perceived by the farmers, was that it taught them both how to learn and the value of continued learning besides giving them a broad general education.

12. Information obtained from travel was important to progressive farmers.

In the past, distance has been a great obstacle to farmers in obtaining information. This is no longer an issue as travel and communications have truly placed the world within one's reach. Farmers often traveled long distances in order to obtain information that might be of benefit to them and their operation. The cost and time spent in travel were considered well worth the potential benefits derived from the information obtained. As travel has become more commonplace, farmer-to-farmer communication networks have expanded to include farmers from other states and, in some cases, from other countries.

13. Progressive farmers were constantly experimenting with methods and materials trying to determine ways to do things better.

Self-initiated experimentation and research were common among all of the farmers. They seemed to be very creative and involved in a variety of self-experimental projects. More common projects included experimentation with new crops, new varieties, different fertilizers or rates of fertilization, new equipment or machinery, and adaptations of existing equipment. If a farmer could see a particular need in his farming

operation or if he had an idea on how to improve a procedure but could not find a marketed solution, he would attempt to fill that need or make that improvement in an experimental, creative manner. One 54 year old dairyman summed up the feelings of many of the interviewed farmers when he said, "If you can envision something, you can build it."

In the area of self-experimentation, winter slack time was often seen by the farmers as the time when they could develop the projects which they had envisioned during the year. Many equipment adaptations, on new as well as old equipment, were made at this time, as well as the development of new pieces of equipment that could help the farmers do a more efficient job.

One of the biggest benefits associated with self-experimentation, as reported by the farmers, came from the association the farmers had with others involved in research. This included not only professional research personnel with whom they cooperated but also other farmers involved in research on the cutting edge of technology.

One obstacle in the innovation adoption process was the lack of knowledge of previously developed innovations. This study uncovered several clear cases where the farmers had used self-experimentation and research to develop equipment, computer programs, or procedures to

solve problems when the solution to those problems had already been developed. Apparently there is a need for better dissemination of new innovations and their applications or a better networking of creative ideas and innovations so that farmers can become aware of what is available rather than needing to "reinvent the wheel".

14. Farmers who have greater resources usually benefit more from the innovations introduced by development agencies than those farmers who have fewer resources, thus widening the socioeconomic benefit gap.

Farmers who own larger farms, enjoy a higher socioeconomic status, and have more communication opportunities are most innovative in adopting new agriculture technologies (Rogers, 1983).

Perhaps a farmer's failure to adopt innovations is due more to a lack of opportunities, rather than to an in-built traditional resistance to change. Farmers with more land, more money, and more knowledge can more easily obtain credit, further information, and other inputs to adopt technical innovations. Since they adopt innovations relatively earlier, they gain more of the benefits of innovations (p. 125).

All of the farmers interviewed in this study seemed to be financially successful in their farming operations, were large scale farmers, and had an extensive communication network in place. They seemed to fit into the

early adopter area (Rogers, 1983). Many of the farmers stated that they were able to remain successful because they were able to invest in newer technologies and take advantage of early profits associated with these technologies. Even though there were many failures along with the successes, the benefits outweighed the risks of innovativeness. There were several farmers, however, who chose not to be the first to adopt but rather who chose to stand back and observe letting others assume the risks. They then jumped in to adopt successful technologies in time to take advantage of the profits associated with the new technology.

All of the farmers interviewed were expanding their operations and were constantly in the process of change. This would seem to support previous research that farmers with greater resources usually benefit more from the innovations introduced and developed than do those farmers who have fewer resources. Thus, the socioeconomic gap among such farmers and those less innovative would widen.

Summary

Farmers of today are involved in the process of continual learning. It requires a continuous effort to keep informed and up-to-date with repeated adaptations and change. Farmers do overcome barriers and obstacles to participate in learning activities.

When the need, interest, and desire to learn were present, farmers sought information. They were very self-directed in their learning activities and wanted to use the fastest and easiest methods available to gather information and sought applied learning for the immediate situation. Learning strategies varied among farmers and each farmer used distinct methods selected on the basis of his past successful experiences. Learning methods used most frequently by the farmers included interpersonal communication, observation, reading/self-study, school attendance, and self-initiated experimentation and research.

Farmers demonstrated creativeness in their use and variety of resources. Each farmer used many sources to obtain information. Those sources listed by the farmers as being of most value included other farmers, commercial companies, neighbors and friends, production organization personnel, farm magazines and journals, land grant college personnel, and consultants.

Creativeness was also demonstrated by the farmers' participation in self-initiated experimentation and research. This participation involved machinery, plant varieties, chemicals, and planting and irrigation methods.

There are many effective ways that a farmer can use to learn. They seek information in all they do and consider learning, keeping current with new technologies, and accepting change as integral factors to their success.

REFERENCES CITED

REFERENCES CITED

- Aslanian, C. B., & Bricknell, H. M. (1980). Americans in transition: Life changes as reasons for adult learning. New York: The College Board.
- Audirac, I., & Beaulieu L. J. (1986). Microcomputers in agriculture: A proposed model to study their diffusion/adoption. Rural sociology, 51 (1), pp. 60-77.
- Awa, N. E., & Van Crowder L., Jr. (March/April 1978). How extension stacks up. The journal of extension, 17.
- Bender, R. E., Cunningham C. J., McCormick, R. W., Wolf, W. H., & Woodin, R. J. (1972). Adult education in agriculture. Columbus, OH: Charles E. Merrill Publishing.
- Bogdan, R. C., & Biklen, S. K. (1982). Qualitative research for education: An introduction to theory and methods. Boston: Allyn and Bacon.
- Bordenave, J. D. (1976). Communication of agricultural innovations in Latin America: The need for new models. Communication research, 3, pp. 135-154.
- Brockett, R. (April, 1983). Self-directed learning and the hard-to-reach adult. Lifelong learning: The adult years.
- Brockett, R. G., Hiemstra R., & Penland, P. R., (1982). Self-directed learning. In C. Klevens (ed.), Materials and methods in adult and continuing education. Los Angeles: Klevens Publishing.

- Brookfield, S. (1984). Adult learners, adult education and the community. New York: Teachers College Press.
- Brookfield, S. (1981). Independent adult learning. Studies in adult education. 13 (1), pp. 15-27.
- Brookfield, S. (1986). Understanding and facilitating adult learning. San Francisco: Jossey-Bass.
- Brundage, D. H., & Mackeraeber, D. (1980). Adult learning principles and their application to program planning. Toronto, ON: Ministry of Education.
- Bultena, G., & Hoiberg, E. (1983). Farmers adopting computers bit by bit. Agri marketing. 21 (2).
- Carlson, John E., & Guenthner, J. F. (1989). The information patterns of Idaho potato growers. American potato journal, 66, pp. 471-487.
- Clifford, M. M. (1981). Practicing educational psychology. Boston: Houghton Mifflin.
- Cross, P. K. (1984). Adults as learners. San Francisco: Jossey-Bass.
- Crawford, H. R. (1969). Factors affecting the establishment of young farm operators in Iowa and implications for agricultural education. Unpublished doctoral dissertation, Iowa State University.
- Dobbert, M. L. (1982). Ethnographic research. New York: Praeger Publishers.
- Domestic Policy Association, Melville, K. (Ed.). (1986). The farm crisis: Who's in trouble, how to respond. Dayton, OH: Domestic Policy Association.
- Elias, J. L., & Merriam, S. (1980). Philosophical foundations of adult education. Malabar, FL: Krieger Publishing.

- Even, M. J. (1982). Adapting cognitive style theory in practice. Lifelong learning: The adult years. 5 (5), pp. 14-17, 27.
- Fantini, M. Changing concepts of education: From school system to educational system. Community, educational, and social impact perspectives. No publishing information available.
- Fantini, M. (Dec., 1978). Community education: Participants and participation. Community education journal, 6.
- Fellenz, R. A., & Conti, G. J. (1984). Comprehensive evaluation of the statewide Texas adult basic education program: Evaluating a human enterprise. College Station, TX: Texas A & M University.
- Gagne, R. M. (1971). Learning research and its implications for independent learning. In R. A. Weisgerberger (Ed.), Perspectives in individualized learning. Itasca, IL.: Peacock.
- Gardner, J. W. (1968). Campus, 1980. New York: The Delacorte Press.
- Garoutte, C. R. (1988). The public's perception of extension in Montana. Unpublished master of science thesis, Montana State University.
- Glaser, B., & Strauss, A. L. (1967). The discovery of grounded theory: Strategies for qualitative research. Chicago: Aldine.
- Guba, E. G. & Lincoln, Y. S. (1981). Effective evaluation. San Francisco: Jossey-Bass.
- Harighurst, R. J. (1972). Developmental tasks and education. (3rd ed.). New York: McKay.
- Harshman, W. C. (1981). Getting the message to young adult farmers. Agricultural education, (54).
- Hassinger, E. (1959). Stages in the adoption process. Rural sociology, 24, pp. 52-53.

- Hiemstra, R. (1976). Lifelong learning: An exploration of adult and continuing education within a setting of lifelong learning needs. Lincoln, NE: Professional Educators Publications.
- Hill, D. A. (Jan./Feb. 1982). The face of the future - agriculture. Voc ed journal of the American vocational association.
- Houle, C. O. (1980). Continuing learning in the professions. San Francisco: Jossey-Bass.
- Johnstone, J. W. C., & Rivera, R. J. (1965). Volunteers for learning: A study of the educational pursuits of adults. Hawthorne, NY: Aldine.
- Knowles, M. (1975). Self-directed learning: A guide for learners and teachers. New York: Association Press.
- Knowles, M. (1970). The modern practice of adult education. New York: Association Press.
- Knowles, M. (1980). The modern practice of adult education. Revised and updated. Chicago: Association Press/Follett.
- Lapinski, M. A. (1986). The farm crisis: Who's in trouble, how to respond. National issues forum. Dayton, OH: Domestic Policy Association.
- Lindeman, E. C. (1926). The meaning of adult education. Authorized reprint (1984). Ann Arbor, MI: University Microfilms International.
- Long, H. B. (1983). Adult learning: Research and practice. New York: Cambridge Books.
- Maslow, A. H. (1954). Motivation and personality. New York: Harper.
- Matheson, N. (Ed.). (1989). AERO'S guide to sustainable agriculture in the northern rockies and plains. Helena, MT: AERO

- McCatty, C. (1973). Patterns of learning projects among professional men. Unpublished doctoral dissertation, University of Toronto.
- Mezirow, J. (1985). A critical theory of self-directed learning. In S. Brookfield (Ed.), Self-directed learning: From theory to practice. New directions for continuing education, No. 25. San Francisco: Jossey-Bass.
- Minzey, J. D., & LeTarte C. E. (1979). Community education: From program to process to practice. Midland, MI: Pendell Publishing.
- Merriam, S. B. (1984). Selected writings on philosophy and adult education. Malabar, FL.
- National Research Council, Aldrich, D. G. (Chairman). (1988). Understanding agriculture. Washington, D. C.: National Academy Press.
- Penland, D. (1979). Self-initiated learning. Adult education, 29 (3), pp. 170-179.
- Phillips, T. (1979). Without education--will you be able to compete? The Iowa agriculturist, 81 (1).
- Reynolds, M. M. (1984). The self-directedness and motivational orientation of adult part-time students at a community college. Unpublished doctoral dissertation, Syracuse University.
- Rockhill, K. (1982). Researching participation in adult education: The potential of the qualitative perspective. Adult education. 33 (1), pp. 3-19.
- Rogers, E. M. (1983). Diffusion of innovations. New York: The Free Press.
- Rogers, J. (1979). Independent learning in the post-compulsory sector in the United Kingdom. Learning opportunities for adults, Vol. 2: New structures, programmes and methods. Paris.

- Ryan, B., & Gross, N. C. (1943). The diffusion of hybrid seed corn in two Iowa communities. Rural sociology, 8, pp. 15-24.
- Smith, K. L. (1980). Educational factors affecting the continued establishment of young farm operators in Iowa. Unpublished doctoral dissertation, Iowa State University.
- Smith, R. M. (1982). Some programmatic and instructional implications of the learning how to learn concept. Proceedings of the Adult Education Research Conference, No. 23. Lincoln: University of Nebraska.
- Skager, R. (1979). Self-directed learning and schooling: Identifying pertinent theories and illustrative research. International review of education, 25 (4), pp. 517-543.
- Stadlman, R. (1973). Follow up study of recent young farm operators in Iowa. Unpublished ag. ed. 590 project, Iowa State University.
- Tough, A. (1971). The adult's learning projects. Toronto, ON: The Ontario Institute for Studies in Education.
- Tough, A. (1979). The adult's learning projects. (2nd ed.). Austin, TX: Learning Concepts.
- U.S. Department of Commerce. (1989). Idaho state and county data. 1987 census of agriculture. Washington, D.C.
- U.S. Department of Commerce Bureau of the Census and USDA Economic Research Service. (1986). Farm population of the United States, 1985. Washington, D. C.: U. S. Government Printing Office.
- Yarborough, J. P., & Scherer, C. (1984). A longitudinal study of farmer adoption of computers: An interim report. Paper presented at the Rural Sociological Society annual meeting. College Station, TX.

APPENDICES

APPENDIX A

SAMPLE SELECTION LETTER

198

Date

Name
Organization
Address

Dear _____:

I am in the process of conducting a research study among progressive farmers and ranchers in southeastern Idaho to help determine sources and methods used in acquiring information regarding their farming practices. I am hopeful that this information will be helpful to farmers and those involved in providing information to them.

For this study, I am asking your help in determining the most progressive farmers from your county. I would appreciate your filling out the enclosed form and returning it to me in the enclosed, self-addressed, stamped envelope. If you have any additional comments or suggestions, please write them on the back of the form.

Thank you very much for your assistance.

Sincerely,

Larry L. Stephens
443 N. 3950 E.
Rigby, ID 83442

Enc.: Progressive Farmer Selection Form

APPENDIX B

PROGRESSIVE FARMER SELECTION FORM

Progressive Farmer Selection Form

County _____

Organization _____

Name _____

Date _____

Selection Criteria:

1. Farmer must be between 25 and 70 years of age.
2. Farmer must have been actively involved in farming for the past five years.
3. Farmer must be a full-time farmer.
4. Farmer must farm 500 or more acres.
5. Farmer must be progressive - defined as one who continues to show progress and improvement as evidence that learning is taking place.
6. Farmer must be technically competent and a sound decision maker.

From the above criteria, please list, in your opinion, the five most progressive farmers from your county.

	Name	Address	Phone #
1.			
2.			
3.			
4.			
5.			

APPENDIX C

MAP OF IDAHO

GEOGRAPHIC LOCATION OF STUDY AREA



APPENDIX D

INTERVIEW FORM

Interview Form

Name _____

Address _____

Phone # _____

Date _____

In talking with others, you have been suggested as an outstanding and progressive farmer. We would like to know some of your farming practices.

Check when completed:

- 1. Brief respondent as to the purpose of the interview.
- 2. Explain the manner in which responses will be recorded and used and receive permission from the respondent.

Demographic Information

1. Age _____

2. Last year of school or degree obtained.

3. How much land do you farm?

Own _____ Rent or lease _____

4. How did your farm involvement begin?

5. What type of crops do you grow or livestock do you raise?

6. Do you have any other money making enterprises?

The following questions will be asked with regards to these four basic areas: General Farm Practices, Management, Technology, and Production Focus. Special emphasis will be given to seeking out information pertaining to how farmers gain new information and the methodology and sources used in the learning process.

1. How, in your opinion, has farming changed over the last few years? As a farmer, what changes and/or adaptations have you made on your farm within the last 5 years which you feel have benefited your farm operation?

2. How did you become aware of or hear about these changes, adaptations or techniques? Where did you first hear about these changes? What were your feelings about these changes at first (excitement, resentment, resistance, doubt etc.)?

3. What sources were used to gain additional information about these changes and the application skills, etc. necessary to implement them on your farm? Did you actively seek out these sources?

4. What future changes to you foresee for this practice? How do you intend to gain further information regarding this change?

Management -

1. Do you own a computer?_____ Type of computer?_____
How did you learn how to use it?

2. Do you have a mobile telephone?_____

There are many sources of technical information for farming. Please indicate the extent of your use of the following sources since 1980.

	Little Use			Some Use			Much Use		
Consultants	1	2	3	4	5	6	7	8	9
Farm magazines	1	2	3	4	5	6	7	8	9
Agricultural bulletins	1	2	3	4	5	6	7	8	9
Radio programs	1	2	3	4	5	6	7	8	9
Television programs	1	2	3	4	5	6	7	8	9
Daily newspaper	1	2	3	4	5	6	7	8	9
County extension	1	2	3	4	5	6	7	8	9
Vocational Agriculture									
Teachers	1	2	3	4	5	6	7	8	9
Soil Conservation									
District	1	2	3	4	5	6	7	8	9
Farmers Home									
Administration	1	2	3	4	5	6	7	8	9
Agriculture Stabilization and									
Conservation Services	1	2	3	4	5	6	7	8	9
Commercial companies	1	2	3	4	5	6	7	8	9
Land grant colleges	1	2	3	4	5	6	7	8	9
Neighbors and friends	1	2	3	4	5	6	7	8	9
Financial institutions	1	2	3	4	5	6	7	8	9
Social organizations	1	2	3	4	5	6	7	8	9
Relatives	1	2	3	4	5	6	7	8	9
Producer organizations	1	2	3	4	5	6	7	8	9
Other_____	1	2	3	4	5	6	7	8	9

How many farm magazines do you subscribe to?_____

If you had it to do over again, would you go into the farming business?

MONTANA STATE UNIVERSITY LIBRARIES



3 1762 10093421 3

HOUCHE
BINDERY LTD
UTICA/OMAHA
NE.