



The agricultural awareness of Montanas elected legislators
by Milford Louis Wearley

A thesis submitted in partial fulfillment of the requirements for the degree of Master of Science in
Agricultural Education
Montana State University
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Abstract:

The purpose of this study was to assess the level of agricultural knowledge and perceptions of those elected officials who served in Montana's 54th legislative session in 1995. Members of the House of Representatives and members of the Senate serving in Montana's 54th legislative session were the population for this study.

Data for this study were gathered through a survey mailed to all members of the House of Representatives and the Senate who served in 1995. Of the 150 survey instrument mailed out, 90 usable surveys were sent back for a 60% return rate. Data were collected in three sections: (1) agricultural knowledge true/false statements, (2) agriculture perception statements, and (3) demographic information of legislators. An analysis of variance (ANOVA) and t-tests were used in statistical analysis of the data.

Conclusions drawn from the data were (1) 44% of Montana's elected officials scored higher than 90% on the seven knowledge concept areas of agriculture, 42% scored between 80% and 89%, and 14% scored between 66% and 79%; (2) Montana's elected officials who served in the legislature, on the average, have positive perceptions of the agriculture industry, with scores varying widely; (3) legislative leaders in Montana have strong positive perceptions about economic situations in production agriculture, animal agriculture, and natural resources/environment issues; (4) based on biotechnology questions and perception statements in the study, about one-fifth of Montana's legislators did not have a full understanding about biotechnology and its contributions to the future of the agriculture industry; (5) legislators rely upon the newspaper media for a majority of their information about agriculture, which may not fully inform them; (6) legislators perceive education about agriculture in the future as more important than it is today.

The data as analyzed indicated a need for better education for the general public about agriculture and agricultural issues. Support and encouragement must be provided to agencies of agricultural education in the future as they strive to maintain or increase public agricultural literacy.

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ELECTED LEGISLATORS**

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

of

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APPROVAL

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This thesis has been read by each member of the graduate 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.

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Date

December 1, 1996

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TABLE OF CONTENTS

	Page
LIST OF TABLES	vii
ABSTRACT	x
1. THE PROBLEM AND ITS SETTING	1
Introduction	1
Purpose of the Study	2
Need for the Study	2
Objectives	6
Assumptions	6
Limitations	7
Definitions	7
2. REVIEW OF LITERATURE	9
Definition of Agricultural Literacy	9
Promoting Agricultural Literacy	10
Testing for Agricultural Literacy	13
3. METHODOLOGY	16
Population	16
Instrument Design	16
Collection of Data	21
Statistical Treatment	22

TABLE OF CONTENTS--Continued

	Page
4. RESULTS OF THE STUDY	24
Introduction	24
Demographics	25
Knowledge of Agriculture	28
Perceptions of Agriculture	35
State Groups' Ability to Educate the Public about Agriculture	47
Sources of Agriculture Information	50
Importance of Issues to Respondents	50
Data Analysis of Influence of Demographics	51
5. CONCLUSIONS, IMPLICATION, RECOMMENDATIONS, AND SUMMARY	54
Conclusions	54
Implication	57
Recommendations	57
Recommendations for Future Studies	58
Summary	59
REFERENCES	61
APPENDICES	65
Appendix A--Cover Letter	66
Appendix B--Follow-up Postcard	68
Appendix C--Survey Instrument	70
Appendix D--Comments on Questions and Statements	79

LIST OF TABLES

Table	Page
1. Years of legislative experience	25
2. Legislative body, political party make-up, and return rate of the respondents	26
3. Population of nearest town to respondents	27
4. Size of legislators' farms	27
5. Distribution of knowledge scores of respondents	28
6. Significance of agriculture knowledge statements answered correctly and incorrectly	29
7. Agricultural policy knowledge statements answered correctly and incorrectly	30
8. Natural resources/environment knowledge statements answered correctly and incorrectly	31
9. Plants in agriculture knowledge statements answered correctly and incorrectly	32
10. Animal agriculture knowledge statements answered correctly and incorrectly	33
11. Agricultural processing knowledge statements answered correctly and incorrectly	34
12. Marketing and distribution knowledge statements answered correctly and incorrectly	35
13. Respondents' perceptions about significance of agriculture	37

LIST OF TABLES--Continued

Table	Page
14. Respondents' perceptions about agricultural policy	38
15. Respondents' perceptions about natural resources/environment	39
16. Respondents' perceptions about plants in agriculture	39
17. Respondents' perceptions about animal agriculture	40
18. Respondents' perceptions about agricultural processing	41
19. Respondents' perceptions about marketing and distribution	42
20. Perception statements with which at least 75% of respondents strongly agreed or agreed	43
21. Perception statements with which at least 90% of respondents strongly agreed or agreed	44
22. Perception statements with which at least 75% of respondents strongly disagreed or disagreed	45
23. Perception statements with which at least 90% of respondents strongly disagreed or disagreed	46
24. Current ability of state groups to educate Montanans about agriculture	48
25. Future ability of state groups to educate Montanans about agriculture	49
26. Media sources of agriculture information	50
27. Agricultural issues most critical to address	51

LIST OF TABLES--Continued

Table		Page
28.	ANOVA of the overall knowledge of agriculture scores according to legislative years of experience	52
29.	<u>t</u> test means and <u>t</u> score results for selected demographic traits	53

ABSTRACT

The purpose of this study was to assess the level of agricultural knowledge and perceptions of those elected officials who served in Montana's 54th legislative session in 1995. Members of the House of Representatives and members of the Senate serving in Montana's 54th legislative session were the population for this study.

Data for this study were gathered through a survey mailed to all members of the House of Representatives and the Senate who served in 1995. Of the 150 survey instrument mailed out, 90 usable surveys were sent back for a 60% return rate. Data were collected in three sections: (1) agricultural knowledge true/false statements, (2) agriculture perception statements, and (3) demographic information of legislators. An analysis of variance (ANOVA) and t-tests were used in statistical analysis of the data.

Conclusions drawn from the data were (1) 44% of Montana's elected officials scored higher than 90% on the seven knowledge concept areas of agriculture, 42% scored between 80% and 89%, and 14% scored between 66% and 79%; (2) Montana's elected officials who served in the legislature, on the average, have positive perceptions of the agriculture industry, with scores varying widely; (3) legislative leaders in Montana have strong positive perceptions about economic situations in production agriculture, animal agriculture, and natural resources/environment issues; (4) based on biotechnology questions and perception statements in the study, about one-fifth of Montana's legislators did not have a full understanding about biotechnology and its contributions to the future of the agriculture industry; (5) legislators rely upon the newspaper media for a majority of their information about agriculture, which may not fully inform them; (6) legislators perceive education about agriculture in the future as more important than it is today.

The data as analyzed indicated a need for better education for the general public about agriculture and agricultural issues. Support and encouragement must be provided to agencies of agricultural education in the future as they strive to maintain or increase public agricultural literacy.

CHAPTER 1

THE PROBLEM AND ITS SETTING

Introduction

"Agriculture is basic to human welfare. It, more than other activities, has shaped our (America's) history and our culture" (Douglass, 1985, p. 17). When most of American society had a tie to the land, this concept was understood and appreciated by a majority of the U.S. population. Even the people who did not have a direct tie to the land had a close origin somewhere in their immediate past. There was no concern about people having little or no knowledge about agriculture. Almost every American had lived the story of agriculture directly, either in part or in whole.

Today a third direct generation has not been raised on the land, and the general public appreciation for the agriculture industry is dropping. The warning signs of a deteriorating knowledge about agriculture by the general public are all around us. In 1950, some 15% of American's population lived on the land (Little, 1987). Production agriculturists comprise less than 2% of the total population today. Mawby (as cited by Douglass, 1985) reports of the 13 million college students in the United States, only 152,500 were majoring in an agricultural discipline. Mawby goes on to state that "few non-agricultural students

elect to take any agricultural courses, though they may eventually hold leadership positions which require them to make decisions on matters affecting agriculture and human nutrition" (Douglass, 1985, p. 7).

Lobbying our elected officials has never been more important. At the same time, having elected officials who are knowledgeable about the agricultural industry has never been more important.

Purpose of the Study

The purpose of the study was to assess the level of agricultural knowledge and perceptions of those elected officials who served in Montana's 54th legislative session in 1995.

Need for the Study

The success story of American agriculture is the envy of the world. Douglass (1985) asks the question, "Do you realize that little more than 100 years ago only one country in the world had succeeded in reducing the number of its citizens engaged in the production and distribution of food to less than half of the total population?" (p. 14). No other nation has been able to feed and clothe its people in such an efficient manner and continue to do so year after year. American agriculture has allowed Americans to spend less than 15% of their income for food, ranking them the lowest in the world (Tisdale, 1991).

Why then has America become agriculture illiterate? The industry might have to look to itself for an answer. By freeing the large number of people from the production cycle of agriculture, America has become very diverse in its culture. By allowing this specialization to happen we have allowed the general public the opportunity of not having to learn about agriculture for their basic survival.

The other problem is the isolation of the interests of the agriculture industry as perceived within the industry. As stated by Johnson (1991), "Agriculture works to put itself separate, we are special!" (p. 1). Richardson (1990) reports that "agriculture has been living in its own sturdy, but isolated, special interest 'production only' farmhouse." The point of American agriculture isolation cannot be made more bluntly than the statement by Mayer and Mayer (1974): "The present isolation of agriculture in American academic life is a tragedy" (p. 83).

To say that production agriculture is taken for granted may be an understatement. However, most people do not realize the importance agriculture plays in American history or in the present society as we live today. As we see the baby boomer generation of Americans coming of age, perceptions about agriculture have changed dramatically in a very short time. Now, with the children of generation X hot on their heels, changes may be more dramatic and far reaching than ever before. To what extent can we contribute what some consider extreme and controversial views, as wildlife preservation and

reintroduction advocates have done, of production agriculture as a movement to get back in touch with the land? In the 1960s we saw actions taken up against the establishment. Now we see group and personal agendas taking action from within or through the government process.

Americans are worried more about the safety of the food they eat than about how much there is or where it might come from (Moore, 1987). During the time of the Alar scare and spraying for the Mediterranean fruit fly, agriculture took a backward step in the general public's eye. In recent years we have seen food poisoning scares that have dealt with cantaloupe, grapes, and hamburger. With all of these situations the basic problem was the handling and distribution of the food, not with the food itself. With an overzealous press leading the way, stories can be overblown and facts under or misreported. In the case of the Alar scare with apples, apple farmers in Washington were hit hard financially. The same happened with cantaloupe farmers in California. A misinformed public has the dramatic facts, not all the facts to make good decisions.

The American people are becoming more health conscious and more aware of the food they consume. A recent news report on CNN (November 8, 1996) reported the fastest growing segment of grocery store retail outlets is the natural food outlets selling natural grown and pesticide free foods. They now make up 10% of the market. The boom is attributed to the people who grew up in the 1960s coming of age 30 years later. A woman was quoted in the report as saying "people are waking up and growing food without chemicals."

Tisdale (1991) made an observation in this manner:

Fear of the unknown often leads to needless public alarm. Agriculturally literate people can make personal informed decisions about agriculture related topics such as food safety, genetic engineering and pesticide versus non-pesticide issues. The often highly sensational media coverage of alar-type scares is seen in context by people with a basic knowledge of agriculture. Those without this basic understanding react without reason, frightened for themselves and their families. The resulting damage to the industry is not easily repaired. (p. 11)

If the industry of agriculture is important to the American way of life and to how our country operates, then surely making decisions about the agriculture industry must be equally important. No one may have a more direct and far reaching impact upon the future of the industry of agriculture than the people who serve as our elected officials. It is then important to assess the agriculture knowledge and perception level of our elected officials if their decisions have a significant impact. Frick and Elliot (1995) point out, "It is important to understand the public's knowledge and opinions toward agriculture. However, it is of utmost importance to understand the way that a given population assimilates information on which it bases its decisions and/or choices" (p. 1). To date no one has assessed the agricultural literacy and perceptions of an elected body.

Legislators are recognized leaders and draw heavily on their backgrounds as a source for decision making. Evidence that supports this notion was found by Humphrey, Stewart, and Linhardt (1994). They concluded that the experience of educators directly influences the information that is taught and how it is presented to students. McBlair (1995) reported that there is a positive

relationship between school administrator agriculture literacy score and the attitudes they hold towards agricultural education. Hence, the question which arises is how knowledgeable are Montana's legislators about agriculture? What agriculture issues do they perceive to be critical in the future?

Objectives

In order to accomplish the purpose of this study, specific objectives were developed. These objectives were:

1. To assess the agriculture knowledge of people elected to serve in the Montana 1995 legislative session.
2. To assess the level of agricultural perceptions of people elected to serve in the Montana 1995 legislative session.

Assumptions

The following assumptions were made concerning this study:

1. People who serve in the Montana legislation have some knowledge and perceptions about agriculture.
2. People who serve in the Montana legislature make decisions about agriculture and the agricultural industry.

Limitations

This study was limited to the state of Montana and the elected officials who served in the 1995 Montana legislature. There were 100 members elected to serve in the House of Representatives and 50 members elected to serve in the Senate.

Definitions

1. Agriculture - The science and technology of utilizing natural resources in a sound financial and environmental method to provide food, fiber, shelter and energy for the benefit of mankind. Agriculture encompasses the study of economics, technology, politics, sociology, international relations and trade, and environmental problems, in addition to biology (Shelhamer, 1991, p. 4).
2. Agricultural literacy - understanding and possessing knowledge of our food and fiber system (Frick, 1990, p. 41).
3. Agricultural knowledge - basic agricultural knowledge includes production of plant and animal products, the economic impact of agriculture, its societal significance, agriculture's important relationship with natural resources and the environment, the marketing and processing of agricultural products, public agricultural policies, the global significance of agriculture, and the distribution of agricultural products. An individual

possessing such knowledge would be able to synthesize, analyze, and communicate basic information about agriculture (Frick, 1990, p. 41).

4. Elected officials - those people who were elected by their constituents in their House and Senate districts to serve in Montana's 54th legislative session of 1995.
5. Farm - land used in production agriculture which can be used to raise livestock or grow crops to sell as agricultural commodities.
6. Farmer - person who operates a farm or ranch for producing agricultural commodities.

CHAPTER 2

REVIEW OF LITERATURE

Definition of Agricultural Literacy

Literacy in mankind's recent history has served as a measurement of progress. Bailyn (1960) suggests that literacy is a basic index of cultural attainment and illiteracy is then a measure of the regression of society. If this is true then American agriculture is in trouble. A study of 2,000 students in Kansas, America's agricultural heartland, showed that school children do not understand much about agriculture (Vining-Koch, 1986). Parallel studies were conducted by Williams (1991) in Oklahoma and by Perey (1990) in Arizona with findings which were similar to the Kansas results.

One definition of agriculture literacy came from Douglass (1985) in an early attempt to define the broad concepts of agricultural literacy.

There are certain pieces of information which are so basic to agricultural literacy that serious consideration should be given to their integration into any curriculum. The list is still tentative, but it includes a description of the place of agriculture in human history; a philosophical investigation of the purposes of agriculture, with some attention to ethical considerations; and an examination of the links between nutrition and human development from the perspective of social science. It also includes a basic introduction to the biochemistry of agroecosystems; a comparative analysis of agricultural technologies, including an assessment of their impacts on ecological and social communities; a description of the

institutions of political and economic power that shape agricultural decision in different societies; and a basic treatment of the demographic transition from higher to lower rates of population growth and the roles that the consumption and production of food play in that transition. (p. 18)

A shorter version was presented by Law and Pepple (1990) in The

Agricultural Education Magazine:

Agricultural literacy may be defined as the development of the individual in the principles and concepts underlying modern agricultural technology. As defined here, it applies to producing, processing, distributing, marketing, and consuming the products of the food and fiber system. It also includes an awareness of the impact agriculture has on the environment, on society, and on everyday living of the individual. (p. 10)

Frick came up with a longer more precise definition of agricultural literacy in his dissertation in 1990.

Agricultural literacy is understanding and possessing a knowledge of our food and fiber system. An individual possessing such knowledge would be able to synthesize, analyze, and communicate basic information about agriculture. Basic agricultural knowledge includes: the production of plant and animal products, the economic impact of agriculture, its societal significance, agriculture's important relationship with natural resources and the environment, the marketing and processing of agricultural products, public agricultural policies, the global significance of agriculture, and the distribution of agricultural products. (p. 41)

Promoting Agricultural Literacy

Education about agriculture cannot be limited to just a few. Bailyn (1960) points out that "although every avenue of activity, every trade and profession, every material effort and cultural discipline has its own 'history,' written or unwritten, it cannot become meaningful in isolation" (p. vii). The National

Academy of Sciences (1988) in its report of the state of agricultural education stated that "agriculture is too important a topic to be taught only to the relatively small percentage of students considering careers in agriculture and pursuing vocational agriculture studies" (p. 1).

Does the U.S. population know that it is lacking in knowledge about agriculture? Little (1987) states, "The reason the agriculture industry has no interpretive information to speak of is that the public does not know how to ask for it. We do not know the terms of agriculture, the language, or the basic concepts" (p. 146).

Little (1987) further states about agriculture:

Farming is the foundation of the largest segment of our economy, but all the same, our most diffuse industry. To where is the average citizen to go for information about agriculture. Most agricultural organizations have to do with providing help to production agriculturists, very little is available to educate the average citizen about the industry of agriculture. (p. 145)

Education in agriculture, what agriculture education is all about, has been fairly well defined since the Smith-Hughes Act of 1917. However, education about agriculture does not fit into the definition, and this is the concern of agricultural educators in educating the public about agriculture. The one statement about agricultural literacy which shook the walls of the agricultural education community came from the National Academy of Sciences (NAS) report entitled Understanding Agriculture--New Directions for Education (1988) which was put together by the Committee on Agricultural Education in Secondary Schools. The NAS report emphasized the point of traditional vocational

agriculture education programs embracing education about agriculture as a key to the agriculture education future. The report stated:

The committee envisions that an agriculturally literate person's understanding of the food and fiber system would include its history and its current economic, social and environmental significance to all Americans. This definition is purposely broad, and encompasses some knowledge of food and fiber production, processing, and domestic and international marketing. As a complement to instruction in other academic subjects, it also includes enough knowledge of nutrition to make informed personal choices about diet and health. Agriculturally literate people would have the practical knowledge needed to care for their outdoor environments, which include lawns, gardens, recreational areas, and parks. (p. 8)

Birkenholz (1992) headed an AAAE (American Association of Agricultural Education) Ad Hoc agricultural literacy work group which formulated the following guiding principles for the development and implementation of agricultural literacy programs:

1. Every citizen of the United State should possess a basic understanding of agriculture.
2. Schools and other agencies of government have a responsibility to educate the citizenry concerning agriculture and its role in American society.
3. Students should be able to apply scientific principles to agricultural applications.
4. By definition, agricultural literacy programs are too broad and pervasive in concept to be implemented through traditional structures of vocational agriculture and state divisions of vocational education.
5. Agricultural literacy programs should be incorporated, insofar as possible, into existing efforts of USDA such as Ag in the Classroom and Cooperative Extension Service programs for youth and adults, state departments of education (in

departments other than vocational and technical education), and universities. (p. 7)

Testing for Agricultural Literacy

With Frick's definition of agricultural literacy in hand, one of the first tests for agricultural literacy came in 1993. Birkenholz (1993) conducted a study testing Indiana High School students, Michigan high school students, rural Missouri adults, and urban Missouri adults. Findings from that study were that adults had a higher level of knowledge and more positive perceptions about agriculture than high school students although each respondent group had relatively positive perceptions of agriculture.

A study conducted in Missouri by Harris and Birkenholz (1996) which tested secondary educators' knowledge of and attitude toward agriculture concluded that educator groups in the study were knowledgeable of agriculture and had a positive attitude toward the agriculture industry. However, the groups did have statistically significant differences between discipline areas. Language arts and mathematics teachers were less knowledgeable and had less positive perceptions about agriculture, whereas agriculture education instructors were more knowledgeable and more positive.

Testing students about their knowledge and attitudes was the focus of one study of enrollment in secondary agriculture education programs compared to not being enrolled. Wright, Stewart, and Birkenholz (1994) did the study to compare

the knowledge and perceptions about agriculture of 11th grade students in small

Missouri schools. The following conclusions were drawn from this study:

Students studying agriculture in schools with an agricultural education program have greater knowledge about agriculture.

Students enrolled in a secondary agricultural education program have a more positive perception towards agriculture.

The agricultural awareness survey instrument is able to detect differences in student knowledge and perception of agriculture.

A weak positive relationship exists between knowledge and perception scores. (p. 58)

A study was conducted by Humphrey, Stewart, and Linhardt (1994) on elementary education majors' knowledge of and perceptions toward agriculture. When asked about their confidence to teach agriculture concepts, only 20% of elementary education majors were confident to teach agricultural concepts. However, those student teachers with agricultural experience were more confident about teaching science topics which were related to agriculture.

A study by Frick, Birkenholz, and Machtmes (1995a) assessed the knowledge and perceptions of 4-H members in a midwestern state. With the information collected at an annual state 4-H conference, it was found that knowledge and perceptions about agriculture were high but varied widely. Members were most knowledgeable about natural resources and marketing of agricultural products and least knowledgeable about the plants in the agriculture concepts area. In the same light, 4-H members were most positive about natural

resources and animal agriculture areas and least positive about the agricultural policy concepts.

Another study by Frick, Birkenholz, and Machtmes (1995b) surveyed rural and urban adults about their knowledge and perceptions of agriculture. The general conclusion was that both of these groups were somewhat knowledgeable about agriculture and had a relatively positive perception of agriculture. Adults in the study were most positive about the natural resource concepts and least positive about the agricultural policy concepts. Rural adults were found to be very positive about the conception statements in the animal agriculture section. Knowledge scores turned out to be highest in the animal agriculture concept area and lowest in the plants in agriculture concept area.

McBlair (1995) concluded that there is a relationship between administrators' agricultural literacy test scores and enrollment in secondary agriculture education programs. Administrators in the study had a mean agriculture literacy score of 69.4%, which was considered minimal agricultural literacy.

CHAPTER 3

METHODOLOGY

Population

The population of the study was all of the members of the 54th legislative session which was held in Helena, Montana in 1995. Names and addresses were secured from the Montana 1995 Directory Fifty-Fourth Session (U.S. West Communications, 1995) and Lawmakers of Montana (Langley & Langley, 1995) put out to the general public. There were 150 total legislators with 100 serving in the House of Representatives and 50 serving in the Senate. Of the 50 senators, there were 41 males and 9 females. In the House of Representatives, 73 were males and 27 were female.

Forty-eight members of the House of Representatives came from a city which had at least one Class AA school. Twenty-one members of the Senate came from a city which had at least one Class AA school.

Instrument Design

The data collection instrument (Appendix C) was divided into three sections. The three sections included a knowledge section, perceptions section, and demographics section. The instrument was originally developed by a research

team that ran a pilot study in December, 1993 (Birkenholz). With Frick's (1990) Delphi study as a guide, seven concept areas were used with each concept area having five knowledge questions and five perception statements. The knowledge and perception portions used these seven concept areas:

1. Significance of Agriculture
2. Policy in Agriculture
3. Agriculture's Relationship with Natural Resources
4. Plant Science
5. Animal Science
6. Processing of Agricultural Products
7. Marketing of Agricultural Products

The first portion of the collection instrument, the knowledge section, contained 35 true/false statements. The respondents were instructed to either answer "True," "False," or "Don't Know" to each statement. As the surveys were collected, the responses were coded into numbers for scoring purposes. A correct response was scored 1 and an incorrect or "Don't Know" response was scored 0. Scores were then computed for each concept area and for the overall knowledge section. The possible scores could range from 0 to 35 with 35 being the highest possible score.

The perception section was the second section of the data collection instrument. This section was also based on the seven concept groups with five statements for each concept area being given for a total of 35 statements. Each

respondent was directed to choose from a Likert-type scale ranging from strongly agree (SA), agree (A), neutral (N), disagree (D) and strongly disagree (SD). As data were collected, the responses were coded to a number: strongly agree--1, agree--2, neutral--3, disagree--4, and strongly disagree--5. Several statements in the perception section of the survey were negatively worded. The response scale from these negatively worded statements was reversed prior to the data analysis so all answers could be considered within the same scale. The total possible range of perception scores was 35 to 175. A lower score indicated a more positive perception of agriculture and a higher score indicated a less positive or negative perception of agriculture.

The third section of the instrument requested respondents to provide personal and demographic information. Respondents were asked to provide information for the following:

1. Gender
2. Home location
3. Legislative experience
4. Population of nearest town
5. Size of farm/ranch (if any)
6. Relatives who lived or worked on a farm
7. Relatives who worked in an agricultural business
8. Enrollment in high school agriculture courses
9. Membership in FFA

10. Membership in 4-H
11. Constituents involved in agriculture
12. Rate the current ability of state groups to educate Montanans about agriculture
 - a. Extension Service
 - b. College of Agriculture at MSU
 - c. Montana Department of Agriculture
 - d. Agriculture in Montana Schools
 - e. Public Education Agricultural Education Programs
 - f. Farm/Ranch Interest Groups (i.e., Farm Bureau)
 - g. University/USDA Research Stations
 - h. Other (Please list)
13. Rate the future ability of state groups to educate Montanans about agriculture
 - a. Extension Service
 - b. College of Agriculture at MSU
 - c. Montana Department of Agriculture
 - d. Agriculture in Montana Schools
 - e. Public Education Agricultural Education Programs
 - f. Farm/Ranch Interest Groups (i.e., Farm Bureau)
 - g. University/USDA Research Stations
 - h. Other (Please list)

14. Regular use of following media to receive agriculture information:
 - a. news magazines
 - b. newspapers
 - c. radio
 - d. television

15. Rank the following issues you think most critical to address:
 - a. Food safety
 - b. Animal welfare
 - c. Agriculture practices that effect the environment
 - d. Viability of our rural economic base
 - e. Conservation of natural resource base
 - f. Biotechnology
 - g. Other (Please list)

This same instrument had been used in at least five prior studies and no significant changes were made to the knowledge and perception statements. The only change or addition was made to the demographic portion to gather specific information pertaining to the population. Therefore, the survey instrument was not pilot tested before being sent out.

With the same survey instrument being used in at least five other studies, the reliability had been checked before. The reliability of the knowledge section of the instrument was assessed by calculating a Kuder-Richardson 20 (KR-20) coefficient over all of the knowledge questions. The KR-20 figure for the

knowledge section of the instrument was .85. The perception portion of the instrument has been assessed by using the Cronbach's alpha coefficient for instrument reliability. The Cronbach's alpha coefficient computed for all statements in the perception section was .90. A national panel of agricultural literacy experts had reviewed the instrument for content validity. In the opinion of the expert panel, the data collection instrument was considered a valid tool to use for assessing agricultural literacy.

Making the survey instrument as non-political as possible was a high priority of the researcher. The cover letter (Appendix A) was put on personal stationery rather than using stationery from Montana State University in order to not bias answers or create concern about how the information might be used. The survey instrument (Appendix C) was printed on both sides of legal size paper and folded into a booklet. Legal size paper allowed for a larger font to be used for reading ease. For efficiency and ease, respondents could circle the answers to the right of the question and send the whole questionnaire back in a self-addressed, stamped envelope. To avoid using address labels, all envelopes were addressed using the database software in Microsoft Works software program and each envelope hand-fed into a laser printer.

Collection of Data

A cover letter (Appendix A) and the survey instrument were mailed out on July 16, 1996. Fifty-seven surveys (38%) were returned within the first week, with

one being returned not filled out. One survey was returned with the identification number ripped away. Within the second week 24 (16%) additional completed surveys were returned.

A follow-up postcard (Appendix B) was sent out on August 8, 1996. The postcard was printed on a high quality paper and hand-fed through a laser printer to avoid address labels. The front of the card had the same mountain scene as the cover of the survey instrument to create an association between the follow-up postcard and the survey instrument. Ten completed surveys (6%) were returned after the postcard was sent making a total of 90 useable surveys sent back for a 60% return. Due to time constraints on the researcher as a full-time teacher and as an acceptable return was received, no additional follow-up was conducted.

Early and late completed survey returns were identified and analyzed separately. Surveys returned from the first mailing were considered as early returns. Completed surveys returned after the follow-up postcard was sent were considered as late returns. No difference was found between early and late respondents' answers.

Statistical Treatment

The data was put into the Excel spreadsheet software program as the returns were mailed back. Using the statistical functions in Excel, means were determined for the knowledge and perception portions of the study. Within the Excel program, the t test and analysis of variance (ANOVA) were also used to

determine if statistical difference existed between knowledge and perception scores within certain stratum of related demographic factors.

CHAPTER 4

RESULTS OF THE STUDY

Introduction

The purpose of the study was to assess the level of agricultural knowledge and perceptions of those elected officials who served in Montana's 54th legislative session in 1995. The specific objectives were:

1. To assess the agriculture knowledge of people elected to serve in the Montana 1995 legislative session.
2. To assess the level of agricultural perceptions of people elected to serve in the Montana 1995 legislative session.

The results of the survey are reported in several parts. Data are presented in the following sections: (1) demographics of the respondents, (2) knowledge of agriculture of respondents, (3) perceptions of agriculture of respondents, (4) state groups' ability to educate the public about agriculture, (5) sources of agriculture information, (6) importance of issues to respondents, and (7) influence of demographic factors data analysis.

Demographics

Of the usable surveys, 70 (78%) were from males and 20 (22%) were from females. This was close to the gender distribution of the Montana 54th legislature of 76% male and 24% female.

A majority of the respondents lived in a town or city. Nineteen (21%) of the legislators indicated their home was on a farm or ranch and 48 (54%) indicated they lived in a town or city. Twenty-two (25%) of the respondents lived in a rural area.

The data in Table 1 reveal that 41 (45.6%) of the respondents indicated that they had 0 to 5 years of experience in the legislature. The next largest group was 22 (24.4%) respondents with experience from 6 to 10 years. Twelve (13.3%) had over 21 years of experience in the legislature.

Table 1. Years of legislative experience.

Legislative Experience in Years	Number	Percent
0-5 years	41	45.6
6-10 years	22	24.4
11-15 years	11	12.2
16-20 years	4	4.4
21 plus years	12	13.3

The political break-down of both the Senate and House of Representatives can be found in Table 2. A greater percentage of members of the House of Representatives (64%) returned completed surveys than did the members of the

Senate (50%). One survey was returned with no identification number and could not be tracked to either legislative body. The data also reveal that Democrats had lower return rates (37.5% and 32%) than did the Republicans (62.5% and 68.0%).

Table 2. Legislative body, political party make-up, and return rate of the respondents.

Legislative Body	Total Number	Percent of Total	Number (n) Returned	Percent Returned
House of Representatives	100		64	64.0
Republican Party	67	67.0	40	62.5
Democratic Party	33	33.0	24	37.5
Senate	50		25	50.0
Republican Party	31	62.0	17	68.0
Democratic Party	19	38.0	8	32.0

Respondents were asked the size in population of the nearest town to their home. The data in Table 3 reveal that most respondents (41.1%) lived closest to the largest population centers in Montana. The next largest group (31.1%) were those respondents who lived in or close to towns under 2,500 people. Twenty-five (18 + 7) of the respondents lived in or close to towns with populations from 2,501 to 25,000 people.

Table 3. Population of nearest town to respondents.

Population	Number	Percent
Under 2,500	28	31.1
2,501 - 10,000	18	20.0
10,001 - 25,000	7	7.8
25,001 - 100,000	37	41.1

The data in Table 4 show the distribution of the size of farms on which the respondents lived. Most (73.0%) answered they did not live on a farm or ranch. Of those who did live on a farm only two lived on a farm with less than 1000 acres while 22 (24.8%) replied the farm they lived on was over 1000 acres.

Table 4. Size of legislators' farms.

Size of Farm	Number	Percent
Do not live on a farm/ranch	65	73.0
10 - 50 acres	1	1.1
50 - 100 acres	0	0.0
501 - 1000 acres	1	1.1
Over 1000 acres	22	24.8

When asked if they had relatives who live or work on a farm, 58 respondents (64.4%) answered yes and 32 (35.6%) answered no. In the same light, 50 legislators (55.6%) answered they had relatives in an agricultural business, and 40 (44.4%) replied that they did not have a relative involved in an agricultural business.

Fourteen percent (13) of the respondents were former members of FFA and 39% (35) of the respondents had been 4-H members. The majority did not have experience as a member of the FFA or 4-H organizations. Nineteen legislators (21.1%) responded they had taken agricultural courses in high school.

When asked if they thought a considerable portion of their constituents were involved in agriculture, about half (48.9%) replied yes while 46 (51.1%) replied no.

Knowledge of Agriculture

The results of knowledge for all respondents are displayed in Table 5. Overall mean knowledge of agriculture scores ranged from a perfect score of 35 (100%) to a low of 23 (66%) correct responses. When putting the scores into a percentage basis, 40 respondents (2 + 12 + 9 + 17) scored 90% or above, 38 respondents (11 + 12 + 9 + 6) scored between 80% and 90%, and 12 respondents (4 + 4 + 1 + 2 + 1) scored less than 80% on the knowledge portion of the survey instrument.

Table 5. Distribution of knowledge scores of respondents.

Range of Knowledge Scores	35	34	33	32	31	30	29	28	27	26	25	24	23
Percentage Score	100	97	94	91	89	86	83	80	77	74	71	69	66
Number Scoring in Range	2	12	9	17	11	12	9	6	4	4	1	2	1

The data in Tables 6-11 disclose that the overall mean knowledge scores for the seven concept areas ranged from a high of 96.4% in the marketing and distribution concept area to a low of 78.4% in the plants in agriculture concept area. Other concept areas scores were 94.9% in natural resources, 90.2% in animal agriculture, 87.7% in significance of agriculture, 84.4% in agricultural processing, and 82.1% in agricultural policy.

The data in Table 6 look at overall mean knowledge score for the significance of agriculture concept area. Just less than half (49.4%) of the respondents knew that the average U.S. farm is not larger than 500 acres. The concept knowledge score was 87.7%. Scores on other significance of agriculture concept statements ranged from 95.6% to 98.9%.

Table 6. Significance of agriculture knowledge statements answered correctly and incorrectly.

Concept Area Statement	% Correct	% Incorrect	% Don't Know
Significance of agriculture:			
There are more farmers in the U.S. than there were 10 years ago.	96.7	2.2	1.1
U.S. research has improved farming methods in other countries.	98.9	1.1	0.0
Thousands of people in the world die of starvation each year.	95.6	1.1	13.3
The average U.S. farm is larger than 500 acres.	49.4	28.1	22.5
Several countries depend on U.S. agricultural exports for food and fiber.	97.8	0.0	2.2
Concept Average	87.7	6.5	7.8

The data in Table 7 reveal two concept statements that over 25% (7.8 + 27.8, 20.2 + 6.7) of the respondents either missed or did not know. The statement government subsidy payments to farmers are used to stabilize food prices was missed by 26.9% (20.2 + 6.7) of the respondents. Over 35% (7.8 + 27.8) of the respondents did not know that one of every five jobs in the U.S. is related to agriculture. A few (13.8% + 2.2%) did not know about agriculture's contribution to the Gross National Product. On the average, 82.1% of the respondent knew the correct answers to the agricultural policy concepts statements.

Table 7. Agricultural policy knowledge statements answered correctly and incorrectly.

Concept Area Statement	% Correct	% Incorrect	% Don't Know
Agricultural policy:			
Less than 3 percent of the U.S. gross national product is from agriculture.	84.4	2.2	13.3
One of every five jobs in the U.S. is related to agriculture.	64.4	7.8	27.8
Local laws and regulations have little effect on farmers.	97.8	2.2	0.0
U.S. agricultural policies influence food prices in other countries.	91.1	4.4	4.4
Government subsidy payments to farmers are used to stabilize food prices.	73.0	20.2	6.7
Concept Average	82.1	7.4	10.4

As data in Table 8 show, in the natural resources and environment concept area, all respondents correctly answered the questions of farming and wildlife being able to survive in the same geographic area and water, soil and minerals are important in agriculture. Over 13% (10.0 + 3.3) of the respondents answered incorrectly or did not know that soil erosion does not pollute U.S. lakes and rivers. Respondents correctly answered the statements in the natural resources and environment concept area 94.9% of the time.

Table 8. Natural resources/environment knowledge statements answered correctly and incorrectly.

Concept Area Statement	% Correct	% Incorrect	% Don't Know
Natural resources/environment:			
Soil erosion does not pollute U.S. lakes and rivers.	86.7	10.0	3.3
Many farmers use tillage practices that conserve the soil.	95.6	0.0	4.4
Farming and wildlife cannot survive in the same geographic area.	100.0	0.0	0.0
Animal wastes are used to increase soil fertility.	92.2	3.3	4.4
Water, soil, and minerals are important in agriculture.	100.0	0.0	0.0
Concept Average	94.9	2.7	2.4

Table 9 data show the lowest concept area mean score (78.4%) for the population was in the plants in agriculture area. A significant number (53.3% + 14.4%) of respondents missed or did not know the answer to the statement of

profits increase as farmers strive for the maximum crop yields. Nearly 18% (8.9 + 8.9) of respondents missed or did not know that biotechnology has increased the pest resistance of plants. The term biotechnology may not be a familiar term to the respondents and could have led to an incorrect response. The respondents recognized that pesticides increase yields (90%) and that plant products are the main source of human food (93.2%).

Table 9. Plants in agriculture knowledge statements answered correctly and incorrectly.

Concept Area Statement	% Correct	% Incorrect	% Don't Know
Plants in agriculture:			
The use of pesticides has increased the yield of crops.	90.0	4.4	5.6
Plant products are the main source of human foods.	93.2	1.1	5.7
Biotechnology has increased the pest resistance of plants.	82.2	8.9	8.9
Profits increase as farmers strive for the maximum crop yields.	32.2	53.3	14.4
Very little of the grain produced in the U.S. is exported.	94.4	2.2	3.3
Concept Average	78.4	14.0	7.6

In the area of animal agriculture, nearly 20% (5.6 + 13.5) of the respondents missed or did not know that biotechnology has increased animal production in the U.S. One might question again if the respondents understand biotechnology. Animals eat foodstuffs that cannot be digested by humans was a

statement which 16.7% (8.9 + 7.8) of the respondents either missed or did not know. The concept average for animal agriculture was 90.2% as indicated by data in Table 10.

Table 10. Animal agriculture knowledge statements answered correctly and incorrectly.

Concept Area Statement	% Correct	% Incorrect	% Don't Know
Animal agriculture:			
Animal health and nutrition are important to farmers.	97.8	0.0	2.2
Animals can be a valuable source of medical products.	88.9	2.2	8.9
Animals eat foodstuffs that cannot be digested by humans.	83.3	8.9	7.8
Biotechnology has increased animal production in the U.S.	80.9	5.6	13.5
Hamburger is made from the meat of pigs.	100.0	0.0	0.0
Concept Average	90.2	3.3	6.5

Examining the agricultural processing concept knowledge scores in Table 11 reveal that 25.8% of the respondents thought that homogenization uses heat to kill bacteria in milk. Another 10.1% did not know the answer to the homogenization question. The researcher noticed, when tabulating the data, 25 of the respondents changed their answers from the wrong answer to the correct answer for this true/false statement. Regarding the statement food safety is a major concern of the food processing industry, 8.9% missed the correct answer

and 3.3% did not know the answer. Twelve (12.2) percent of the respondents did not realize new products have been developed using surplus grain. The concept average score for agricultural processing was 84.4%.

Table 11. Agricultural processing knowledge statements answered correctly and incorrectly.

Concept Area Statement	% Correct	% Incorrect	% Don't Know
Agricultural processing:			
Food safety is a major concern of the food processing industry.	87.8	8.9	3.3
Homogenization uses heat to kill bacteria in milk.	64.0	25.8	10.1
New products have been developed using surplus grains.	87.8	0.0	12.2
Pasteurization uses heat to kill bacteria in milk.	91.1	1.1	7.8
Using grain alcohol for fuel reduces the U.S. dependence on foreign oil.	91.1	5.6	3.3
Concept Average	84.4	24.3	7.3

The marketing and distribution concept area had fewer incorrect and don't know answers than any of the other concept areas. Table 12 data reveal that every respondent (100%) knew that an efficient food distribution system is essential to the agricultural industry. The other correct responses varied from 91.0% to 97.8%. Some respondents (2.2% + 6.7%) did not know that feed grain is sold on the world market.

Table 12. Marketing and distribution knowledge statements answered correctly and incorrectly.

Concept Area Statement	% Correct	% Incorrect	% Don't Know
Marketing and distribution:			
Processing increases the cost of food products.	95.6	3.3	1.1
The U.S. does not sell its feed grains on the world market	91.0	2.2	6.7
Grain exports are usually transported between continents by airplane.	97.8	1.1	1.1
An efficient food distribution system is essential to the agricultural industry.	100.0	0.0	0.0
Transportation and storage effects the supply of agricultural products.	97.8	1.1	1.1
Concept Average	96.4	1.5	2.0

Perceptions of Agriculture

Each respondent was directed to respond to the perception statements on the survey instrument by using a Likert-type scale ranging from strongly agree (SA), agree (A), neutral (N), disagree (D), and strongly disagree (SD). Responses when analyzed were coded to a number: strongly agree--1, agree--2, neutral--3, disagree--4, and strongly disagree--5. Several statements in the perception section of the survey were negatively worded. The response scale from these negatively worded statements was reversed prior to the data analysis so all answers could be considered within the same scale. The total possible range of perception scores was 35 to 175. A lower score indicated a more positive perception of agriculture and a higher score indicated a less positive or negative perception of agriculture.

Individual respondent perception scores ranged from a low of 44 (more positive) to a high of 92 (less positive).

The coding of the perception answers ranged from strongly agree 1.00-1.49, agree 1.50-2.49, neutral 2.50-3.49, disagree 3.50-4.49, to strongly disagree 4.50-5.00. The perception score as reported in the following tables is the mean of the individual scores in a specific concept area.

The overall mean concept perception scores ranged from a low of 1.8 (agree) in the agriculture policy area and the animal science concept areas to the highest concept score of 2.2 (agree) in significance of agriculture concept area. The overall mean concept area perception score was a 2.0 (agree). All concept area perception scores showed that, overall, the respondents have a positive attitude towards the agriculture perception statements.

Perception scores for significance of agriculture concepts are shown in Table 13. Respondents had the highest perception (1.8) towards the statement of U.S. citizens spend a higher percent of their income on food than in other countries. Overall the respondents were neutral (2.5) on the statement that people are moving away from rural areas due to changes in agriculture. The respondents agreed that a strong agriculture is more important than military power (2.4) and that technology has improved the world food supply (2.0). They also recognized that developing countries lack the ability to produce enough food (2.4).

Table 13. Respondents' perceptions about significance of agriculture.

Concept Area Statement	Perception Score*
Significance of agriculture: U.S. citizens spend a higher percent of their income on food than in other countries.	1.8**
People are moving away from rural areas due to changes in agriculture.	2.5
A strong agricultural industry is more important than military power.	2.4
The world food supply has increased as a result of improved technology	2.0
Developing countries lack the ability to produce enough food.	2.4
Concept Average	2.2

* Strongly agree 1.00-1.49, agree 1.50-2.49, neutral 2.50-3.49, disagree 3.50-4.49, strongly disagree 4.50-5.00.

** The response scale for negatively worded items was reversed to compare perception scores in a like manner.

In the agricultural policy concept area, respondents agreed with the statement that the U.S. needs a steady supply of food and fiber goods to remain strong (1.6). To a lesser degree (2.1) respondents agreed with the statement that agriculture employs a large number of people in this country. Respondents recognized that farmers do not earn too much money (1.8). They also recognized that agriculture exports help to reduce the U.S. trade deficit (1.7) and that government should not exert more control over farming (1.7). Agricultural policy perception concept scores are found in Table 14.

Table 14. Respondents' perceptions about agricultural policy.

Concept Area Statement	Perception Score*
Agricultural policy:	
Agriculture employs a large number of people in this country.	2.1
Farmers earn too much money.	1.8**
Agricultural exports help to reduce the U.S. trade deficit.	1.7
The U.S. needs a steady supply of food and fiber goods to remain strong.	1.6
The government should exert more control over farming.	1.7**
Concept Average	1.8

* Strongly agree 1.00-1.49, agree 1.50-2.49, neutral 2.50-3.49, disagree 3.50-4.49, strongly disagree 4.50-5.00.

** The response scale for negatively worded items was reversed to compare perception scores in a like manner.

The data reveal in Table 15 that legislators agreed (1.9) with the statements in the natural resources and environment concept area. The statement that not all land is suitable for farming had the second lowest (most positive) perception score (1.5) of all statements presented. The respondents perceived that agricultural practices are not harmful to the environment (2.0) and that agriculture is not the greatest polluter of our water supplies (2.0).

All but one of the perception scores for the statements in the plants in agriculture concept area fell into the middle of the agree range (2.1). Respondents were neutral (2.6) on the statement that organic production methods are a realistic alternative to using pesticides. Respondents perceived the importance of biotechnology (2.0), hybrid plants (2.0), and use of chemicals (2.0)

Table 15. Respondents' perceptions about natural resources/environment.

Concept Area Statement	Perception Score*
Natural resources/environment:	
Pesticides can be used safely when producing food.	1.9
Not all land is suitable for farming.	1.5
Agricultural practices are harmful to the environment.	2.0**
Only organic methods should be used to produce food.	2.0**
Agriculture is the greatest polluter of our water supplies.	2.0**
Concept Average	1.9

* Strongly agree 1.00-1.49, agree 1.50-2.49, neutral 2.50-3.49, disagree 3.50-4.49, strongly disagree 4.50-5.00.

** The response scale for negatively worded items was reversed to compare perception scores in a like manner.

Table 16. Respondents' perceptions about plants in agriculture.

Concept Area Statement	Perception Score*
Plants in agriculture:	
Organic production methods are a realistic alternative to using pesticides.	2.6
Biotechnology has increased the yield of crops in developing countries.	2.0
Raising hybrid plants results in higher yields.	2.0
Farmers should not use chemicals in crop production.	2.0**
Agriculture has become too mechanized.	2.0**
Concept Average	2.1

* Strongly agree 1.00-1.49, agree 1.50-2.49, neutral 2.50-3.49, disagree 3.50-4.49, strongly disagree 4.50-5.00.

** The response scale for negatively worded items was reversed to compare perception scores in a like manner.

in increasing crop production. Results of respondents' perception scores for the plants in agriculture concept area are found in Table 16.

Data shown in Table 17 reveal that respondents strongly agreed with the statement that animals should be used for food (1.3). Respondents disagreed that animals have the same rights as people (1.5). While legislators agreed that farmers take good care of their animals (1.8) and farmers are concerned about the humane treatment of animals (1.8), they agreed to a lesser extent (2.4) that confinement is an acceptable livestock practice.

Table 17. Respondents' perceptions about animal agriculture.

Concept Area Statement	Perception Score*
Animal agriculture:	
Confinement is an acceptable practice when raising livestock.	2.4
Farmers take good care of their animals.	1.8
Farmers are concerned about the humane treatment of animals.	1.8
Animals have the same rights as people.	1.5**
Animals should not be used for food.	1.3**
Concept Average	1.8

* Strongly agree 1.00-1.49, agree 1.50-2.49, neutral 2.50-3.49, disagree 3.50-4.49, strongly disagree 4.50-5.00.

** The response scale for negatively worded items was reversed to compare perception scores in a like manner.

The information in Table 18 discloses that respondents perceived that processing food products adds value to farm products (1.8) and that processing is

a benefit to consumers (2.0) even though processing adds to the cost of the food (2.0). Respondents had a neutral perception of the statement that consumers prefer processed foods to raw products (2.5).

Table 18. Respondents' perceptions about agricultural processing.

Concept Area Statement	Perception Score*
Agricultural processing:	
Consumers prefer processed foods to raw products.	2.5
Processing adds value to farm products.	1.8
Processing food products is a benefit to consumers.	2.0
Processing adds more to the cost of food than the raw product.	2.0
Farm grains are becoming an important energy source in the U.S.	2.3
Concept Average	2.1

* Strongly agree 1.00-1.49, agree 1.50-2.49, neutral 2.50-3.49, disagree 3.50-4.49, strongly disagree 4.50-5.00.

Data in Table 19 show that respondents were in agreement (2.1) with the marketing and distribution perception concepts. Legislators responded in a neutral manner (2.6) regarding the statement the U.S. should allow free trade with other countries for food products. Respondents agreed that developing countries need help in distributing food among needy people (2.1). Respondents agreed (1.7) with the statement that farmers should develop new and innovative marketing strategies. Respondents agreed with the statement farmers have no control over food prices (2.4).

Table 19. Respondents' perceptions about marketing and distribution.

Concept Area Statement	Perception Score*
Marketing and distribution:	
Developing countries need help to be able to store food safely.	1.9
Farmers should develop new and innovative marketing strategies.	1.7
The U.S. should allow free trade with other countries for food products.	2.6
Farmers have no control over food prices.	2.4**
Developing countries need help in distributing food among needy people.	2.1
Concept Average	2.1

* Strongly agree 1.00-1.49, agree 1.50-2.49, neutral 2.50-3.49, disagree 3.50-4.49, strongly disagree 4.50-5.00.

** The response scale for negatively worded items was reversed to compare perception scores in a like manner.

While the previous data analysis resulted in mean perception scores, the researcher was interested in knowing the frequency at which legislators reacted to the perception statements. The following section is concerned with the statements with which over 75% or 90% of the respondents either agreed or disagreed.

The perception statements with which at least 75% of the respondents strongly agreed or agreed are displayed in Table 20. Only 68 of the 90 legislators viewed as important the issue that agriculture as an industry employs a large number of people in the U.S. Seventy-seven respondents perceived pesticides as safe in food production, and raising hybrid plants will provide higher yields. Biotechnology was viewed by 78 legislators as a means to increase yields in developing countries, and 74 individuals thought developing countries still need

help in distributing food among their people. Only 74 legislators viewed food processing as a benefit to consumers.

Table 20. Perception statements with which at least 75% of respondents strongly agreed or agreed.

Perception Statement	Number Strongly Agreed	Number Agreed	Total Number*
Agriculture employs a large number of people in this country.	31	37	68
Pesticides can be used safely when producing food.	27	50	77
Biotechnology has increased the yield of crops in developing countries.	13	65	78
Raising hybrid plants results in higher yields.	13	65	78
Processing food products is a benefit to consumers.	17	59	76
Developing countries need help in distributing food among needy people.	8	66	74

*Total N = 90 or 89 depending on whether or not a statement received a response.

The perception statements with which at least 90% of the respondents strongly agreed or agreed are displayed in Table 21. All respondents agreed that world food supplies have increased and on the importance of the U.S. needing a steady supply of agricultural commodities to remain a strong world power and, in the same light, using agriculture commodities to reduce the U.S. trade deficit. Legislators felt that not all land was suitable for production agriculture. Farmers are concerned about the humane treatment of their animals and generally take

Table 21. Perception statements with which at least 90% of respondents strongly agreed or agreed.

Perception Statement	Number Strongly Agreed	Number Agreed	Total Number*
Developing countries need help to be able to store food safely.	19	63	82
Not all land is suitable for farming.	46	42	88
Farmers take good care of their animals.	22	61	83
Processing adds value to farm products.	20	65	85
Farmers should develop new and innovative marketing strategies.	29	56	85
Agricultural exports help to reduce the U.S. trade deficit.	33	53	86
Farmers are concerned about the humane treatment of animals.	24	60	84
The world food supply has increased as a result of improved technology	14	67	81
The U.S. needs a steady supply of food and fiber goods to remain strong.	39	51	90
Processing adds more to the cost of food than the raw product.	15	67	82

*Total N = 90 or 89 depending on whether or not a statement received a response.

good care of them, according to at least 90% of the respondents. More than 82 of the 90 legislators perceived that processing adds more to the cost of food while processing adds value to farm products, but farmers still need to develop new marketing techniques for their farm commodities. Developing countries still need help with safe food storage was a perception held by 82 of the respondents.

The data displayed in Table 22 are the perception statements with which at least 75% of the respondents disagreed or strongly disagreed. Three-fourths of the legislators understood the fact that U.S. citizens spend a lower percent of their income on food than in other countries, yet there were 15 (89 - 74) legislators who were either neutral, agreed, or strongly agreed that U.S. citizens spend a higher percent of their income on food than in other countries. Thirteen (90 - 77) legislators were neutral or agreed that farmers earn too much money,

Table 22. Perception statements with which at least 75% of respondents strongly disagreed or disagreed.

Perception Statement	Number Strongly Disagreed	Number Disagreed	Total Number*
U.S. citizens spend a higher percent of their income on food than in other countries.	50	24	74
Farmers earn too much money.	38	39	77
The government should exert more control over farming.	37	41	78
Only organic methods should be used to produce food.	20	54	74
Agriculture is the greatest polluter of our water supplies.	33	35	68
Farmers should not use chemicals in crop production.	24	49	73
Agriculture has become too mechanized.	26	47	73

*Total n = 90 or 89 depending on whether or not a statement received a response.

suggesting a lack of understanding of the economic picture of production agriculture. Seventy-three legislators agreed chemicals should be used in crop production and farmers should not be limited to only organic methods of food production. Sixty-eight respondents felt agriculture is not a great polluter of our water supplies. Most legislators (78) felt government should exert less control over production agriculture, and 73 respondents perceived agriculture as being too mechanized. This may come from the thought that bigger machines mean bigger corporate farms which pose a threat to the livelihood of the smaller family farm.

Table 23 data show perception statements with which at least 90% of the respondents strongly disagreed or disagreed. It is interesting to note that both perception statements were in the animal agriculture concept area: animals have the same rights as people (50 + 31) and animals should not be used for food (60 + 27). This high level of disagreement in the animal agriculture area may stem from the vast amount of press information which has been given to and taken from animal rights groups and wildlife advocates over the past few years.

Table 23. Perception statements with which at least 90% of respondents strongly disagreed or disagreed.

Perception Statement	Number Strongly Disagreed	Number Disagreed	Total Number*
Animals have the same rights as people.	50	31	81
Animals should not be used for food.	60	27	87

*Total n = 90 or 89 depending on whether or not a statement received a response.

State Groups' Ability to Educate the Public about Agriculture

Legislators were asked about a list of state agricultural groups and which groups currently have the best ability to educate the state's people about the food and fiber system. They were to indicate on a scale of 1 to 7 with 1 and 2 being poor ability, 3 and 4 being good ability, and 5 through 7 being excellent ability to educate Montanans about agriculture. Of the given list of choices (Table 24), the College of Agriculture at Montana State University--Bozeman and the Extension Service were perceived as currently having excellent ability to deliver information about agriculture to the public with a mean rating of 4.6 (excellent). While all other organizations received a good rating (4.0 - 4.5), Public Education Agricultural Education Programs (4.0) received the lowest good rating. The Montana Department of Agriculture and Farm and Ranch Interest Groups received mean ratings of 4.1. Ag in Montana Schools received a mean rating of 4.5. This may be due to Ag in Montana Schools being a check-off program, hence creating legislative awareness. University and USDA research stations were rated as having a good (4.2) ability to educate Montanans about agriculture. The "other" category was provided to respondents so they could mention groups that were not included on the survey instrument. Groups mentioned by the respondents included the schools in general curriculum, media, membership groups including WIFE (Women Involved in Farm Economics) and stockgrowers, family, 4-H (kids and fairs), radio (ag news), and public information programs.

Table 24. Current ability of state groups to educate Montanans about agriculture.

State Groups	Mean*	Number Responding (n)
Extension Service	4.6	83
College of Agriculture at Montana State University	4.6	82
Montana Department of Agriculture	4.1	83
Ag in Montana Schools	4.5	82
Public Education Agricultural Education Programs	4.0	81
Farm and Ranch Interest Groups	4.1	82
University and USDA Research Stations	4.2	82
Other	5.9	8

*1.0 to 2.5 - poor ability, 2.6 to 4.5 - good ability, 4.6 to 7.0 - excellent ability.

When asked about the future ability of state groups to educate the public about the food and fiber system, Ag in Montana Schools recorded the highest mean (5.1). The data in Table 25 reveal that all organizations were rated as important (greater than 4.5). The State of Montana Department of Agriculture received the lowest rate of 4.7. Additional groups included College of Agriculture at Montana State University at 5.0, Farm and Ranch Interest Groups at 4.9, Extension Service at 4.9, Public Education Agricultural Education Programs at 4.8, and University and USDA Research Stations at 4.8. It should be noted that all future abilities (Table 25) were rated higher than present abilities (Table 24).

This suggests that all of these organizations have an increasing responsibility for educating the public about agriculture in the future.

The "other" category in Table 25 was provided to respondents so they could mention groups that were not included on the survey instrument. Groups mentioned by the respondents included the media, families, 4-H and fairs, and public information programs.

Table 25. Future ability of state groups to educate Montanans about agriculture.

State Groups	Mean*	Number Responding (n)
Extension Service	4.9	76
College of Agriculture at Montana State University	5.0	76
Montana Department of Agriculture	4.7	76
Ag in Montana Schools	5.1	75
Public Education Agricultural Education Programs	4.8	75
Farm and Ranch Interest Groups	4.9	75
University and USDA Research Stations	4.8	75
Other	4.8	4

*1.0 to 2.5 - no importance, 2.6 to 4.5 - important, and 4.6 to 7.0 - very important.

Sources of Agriculture Information

For agricultural news, respondent were asked to identify their most common use of four media sources. Information in Table 26 indicates that newspapers (62) were the most common media used to gather information about agriculture. Television (28) was the least used mode of information. Other media sources listed were radio (41) and news magazines (39). Most respondents did select more than one source or all four sources, so the number of responses exceeds the number of respondents.

Table 26. Media sources of agriculture information.

Media Type	n*
News magazines	39
Newspapers	62
Radio	41
Television	28

*Respondents selected more than one source, so number of responses is greater than the number of respondents.

Importance of Issues to Respondents

Data in Table 27 were the respondents' ranking of issues most critical to address. Respondents were asked to rank the most critical issue with a 1 and the least critical issue with a 6 or 7. The highest ranking issue was the viability of the

rural economic base with a high average ranking of 2 out of 7. Animal welfare was the lowest ranking issue at 5.6. Additional issues included conservation of our natural resource base at 2.9, food safety at 3.2, agricultural practices that affect the environment at 3.3, and biotechnology at 4.2. Other issues were provided and ranked by 5 respondents and included youth education, weed control, education of the public about agriculture, adverse effects of free trade, and unknown.

Table 27. Agricultural issues most critical to address.

Issue	Mean Rank*	Number Responding (n)
Food safety	3.2	73
Animal welfare	5.6	72
Agriculture practices that affect the environment	3.3	73
Viability of our rural economic base	2.0	73
Conservation of our natural resource base	2.9	74
Biotechnology	4.2	72
Other	4.0	5

*1 - most critical to 6 or 7 - least critical.

Data Analysis of Influence of Demographics

An analysis of variance test was conducted on the overall agriculture knowledge scores when grouped according to years of legislative experience. Data in Table 28 reveal legislators with 21 plus years of experience scored an average of 31.4 (89.7%) while the legislators with 11 to 15 years of experience scored an

average of 29.1 (83.1%). Other group mean test scores were legislators with 0 to 5 years experience at 30.7 (87.7%), legislators with 6 to 10 years experience at 31.0 (88.6%), and legislators with 16 to 20 years of experience scoring 29.8 (85.1%).

An ANOVA was run with a significant level of .05. The ANOVA produced a P-value of 0.2 showing no significance. There was not a significant variation between the means of knowledge test scores when grouping respondents by legislative years of experience.

Table 28. ANOVA of the overall knowledge of agriculture scores according to legislative years of experience.

Years of Experience	Count	Average*	Variance
0-5 years	41	30.7	7.7
6-10 years	22	31.0	7.9
11-15 years	11	29.1	5.1
16-20 years	4	29.8	14.3
21 plus years	12	31.4	3.4

Source of Variation	Sum of Squares	Degree of Freedom	Mean of Squares	F	P-value
Between groups	40.5	4	10.1	1.4	0.2
Within groups	604.4	85	7.1		

*Maximum possible score was 35.

† tests were run on agriculture knowledge and agriculture perception scores comparing three demographic traits. Demographic traits compared were non-farm compared to farm, member of the House of Representatives compared to member of the Senate, and member of the Republican party compared to member of the Democratic party.

Data in Table 29 reveal a significant difference in perception scores between respondents from a non-farm background compared to those from a farm background. Both the knowledge and perception score comparison of the House members to Senate members were significant. One possible explanation may be that twice as many completed returns were from House of Representative

Table 29. t test means and t score results for selected demographic traits.

Demographic Trait	n	Mean	t Score
Farm - Knowledge Non-Farm - Knowledge	24 65	31.3 30.5	-1.42
Farm - Perception Non-Farm - Perception	24 65	63.4 71.8	3.63*
House - Knowledge Senate - Knowledge	64 25	30.2 31.8	-2.99*
House - Perception Senate - Perception	64 25	71.1 65.3	2.23*
Republican - Knowledge Democrat - Knowledge	57 32	30.6 30.9	-0.50
Republican - Perception Democrat - Perception	57 32	67.0 73.9	-2.82*

*Significant difference between the two groups. $P = .05$.

members as from Senate members. The other significant difference was between perception scores of Republicans and Democrats. This may be explained by the fact that Republicans had 57 survey returns compared to Democrats with 32 survey returns.

CHAPTER 5
CONCLUSIONS, IMPLICATION, RECOMMENDATIONS,
AND SUMMARY

Conclusions

The purpose of the study was to assess the level of agricultural knowledge and perceptions of those elected officials who served in Montana's 54th legislative session in 1995. Members of the House of Representatives and members of the Senate of Montana's 54th legislative session were surveyed.

In order to accomplish the purpose of this study, specific objectives were developed. These objectives were:

1. To assess the agriculture knowledge of people elected to serve in the Montana 1995 legislative session.
2. To assess the level of agricultural perceptions of people elected to serve in the Montana 1995 legislative session.

The knowledge and perception scores in this study can only be based upon the knowledge and perception statements as phrased in the survey instrument (Appendix C). The conclusions of this study can only be applied to the population which was surveyed and not to the general population. The data analysis brought out the following conclusions:

1. Forty-four percent of Montana's elected officials scored higher than 90% on the seven knowledge concept areas of agriculture, 42% scored between 80% and 89%, and 14% scored between 66% and 79%.
2. Montana's elected officials who served in the 54th legislature, on the average, have a positive perception of the agriculture industry as a group. However, perceptions varied widely. Factors that contribute to perceptions about agriculture are where the legislator lived and political background.
3. Legislative leaders in Montana have strong positive perceptions about the economic well-being of farmers. This was based on responses to economic statements contained within the seven concept areas. However, 67% of legislators missed the basic economic principle in the plant science knowledge area that profits do not necessarily increase as farmers strive for maximum crop yields. Also, about one-third of the legislators lack knowledge about the size of the agricultural industry and its contribution to the Gross National Product. In addition, legislators have a positive perception about agricultural policy and the viability of our rural economic base. This is evidenced by legislators' rating the viability as the most critical issue to address and perception scores in the overall agricultural policy concept area.
4. Based on biotechnology questions and perception statements in the study, about one-fifth of Montana's legislators did not have a full understanding about biotechnology and its contributions to the future of the agriculture industry. With nearly 20% of the respondents missing knowledge questions

that pertain to biotechnology and the low ranking of biotechnology as an issue to address, biotechnology's potential for advancing agriculture may not be fully understood. Some legislators may not see the need for biotechnology. However, over 75% of legislators agreed that biotechnology has increased yields of crops in other countries and raising hybrid plants results in higher crop yields.

5. Legislators have strong positive perceptions about the animal agriculture industry and natural resources/environment concept areas. Traditionally Montana is a strong livestock state and knowledge and perception scores showed that legislators understood livestock production. Perceptions about natural resources, the environment, and agriculture are that all function well together as shown by legislators' agreement with the use of chemicals in crop production and perceptions of about two-thirds of the legislators that agriculture is not the greatest polluter of our waters. Legislators perceived that agriculture practices are not harmful to the environment and understood that farming and wildlife can survive in the same area.
6. Legislators perceive that education about agriculture in the future will be more important than it is currently. While educational agencies are currently doing a good job, they must have an increased emphasis in the future of educating the public about agriculture.
7. Legislators rely upon the newspaper media for a majority of their information about agriculture. In the opinion of the researcher, there are

limited sources for current information about agriculture in the state of Montana, and because newspapers will publish what the editors feel is important, legislators may not be fully informed about the agriculture industry.

Implication

The data collected for this study allowed the researcher to determine the following implication:

1. Legislators have gained knowledge about agriculture through informal methods other than public school agricultural education programs, 4-H, or FFA. This may be explained by the very nature of legislators wanting to be leaders, which goes along with their willingness to become more knowledgeable.

Recommendations

As a result of this study, the following recommendations are offered for the future of agricultural education:

1. Support and encouragement must be provided to the agricultural education agencies in the future as they strive to maintain or increase public agricultural literacy.

2. An effort needs to be made to better educate legislators and the public about biotechnology. Public schools and adult education programs should increase the awareness and use of biotechnologies.
3. Possibly a programmatic emphasis in agricultural public relations could improve the comprehensive delivery of agricultural information to Montana's public.
4. An agricultural education center should be established at Montana State University--Bozeman which would bring all sources of agriculture and agricultural education together into a focused plan for educating the public about agriculture and its importance. With legislators' high ranking of the future ability of the College of Agriculture, the Extension Service, and research stations to educate the public about agriculture, an agricultural education network with all state agriculture groups involved could be easily put into place.

Recommendations for Future Studies

The researcher proposes the following for future studies of the subject:

1. Questions on the survey instrument concerning home location and size of farm should be combined. Improve the instructions for ranking items and give an example of ranking for those questions. In the instructions, define terms such as farm vs. ranch, biotechnology, and conservation. A demographic question on the level of education would be helpful to

determine if level of education may have had an effect on overall knowledge and perception of agriculture.

2. Further study as to where legislators receive their agriculture information and how much information they receive are important issues. The quantity and quality of news about agriculture affect the legislators' and public's future knowledge and perceptions about agriculture. A study that examines lobbyists may also add information about those individuals or groups attempting to influence agricultural policy.
3. Other states need to survey state elected officials to compare the results with the data collected in this study.
4. A study should be conducted on a national level to determine the agricultural knowledge and agricultural perceptions of our U.S. House of Representative and Senate members in Congress.
5. Perform this same study again since legislative members change due to the re-election process and retirement from public service.

Summary

The results from this study can establish guidelines for educating our elected officials about the industry of agriculture and the importance agriculture plays in American society. Data in the study point out concept areas in which legislators could be influenced. At the same time, concept areas are pointed out which would not be easily addressed before legislators. The data provide

information to the public and agriculture groups to better know how legislators feel about the agriculture industry.

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APPENDICES

APPENDIX A
COVER LETTER



Milford L. Wearley, Ag-Ed Instructor
 1551 8th Lane NW
 Choteau, MT 59422
 (406) 466-2508

Choteau High School
 204 7th Ave NW
 Choteau, MT 59422
 (406) 466-5303 FAX(406) 466-5424

July 16, 1996

Rep. «First_Name» «Last_Name»
 «Address»
 «City», MT «Zip»

Dear Representative «Last_Name»:

Agriculture is the number one industry in Montana. As Montanans, we pride ourselves for our agriculture industry and the many facets of everyone's life that it touches. As a leader in Montana, you hold a very important position that affects the direction of all Montana's future including its agriculture industry.

As a part of my graduate program at Montana State University, I am conducting a study to determine Montana's leaders' perception and knowledge about the agriculture industry and its future. To gain a statewide agriculture perception you have been selected as an official from your area. The survey was developed with the input of a variety of people interested in communicating the importance of agriculture.

Your input is important! All information gathered will be kept confidential and will not be used for any purpose unrelated to this study, nor will any individual be identified. The survey instrument is coded so your name can be removed from the mailing list when your questionnaire is returned. The survey instrument should take ten minutes to complete. Would you please return the survey by August 1, 1996, in the enclosed stamped, self-addressed envelope?

Upon completion of this project, I would be glad to furnish you with a report of the findings. If you have any questions or concerns, please contact me at any time. I will be looking forward to receiving your completed questionnaire.

Thank you for your time.

Sincerely,

Milford L. Wearley
 Ag-Ed/FFA Instructor
 Choteau High School

Dr. C. Van Shelhamer
 Associate Professor
 Montana State University

APPENDIX B
FOLLOW-UP POSTCARD

Recently I sent you a questionnaire on agriculture awareness of Montana's leaders. To date I have not received your reply. If you have not sent your survey, could you please take 5 minutes to answer the questions and return the survey to me. I would appreciate your response. All responses will be kept confidential.

If you would need an additional copy of the questionnaire or if you have any questions please feel free to call me at 466-2508.

Thank you for your time and effort in helping to complete this study.

Sincerely,
Milford Wearley
Choteau HS Ag-Ed Instr.

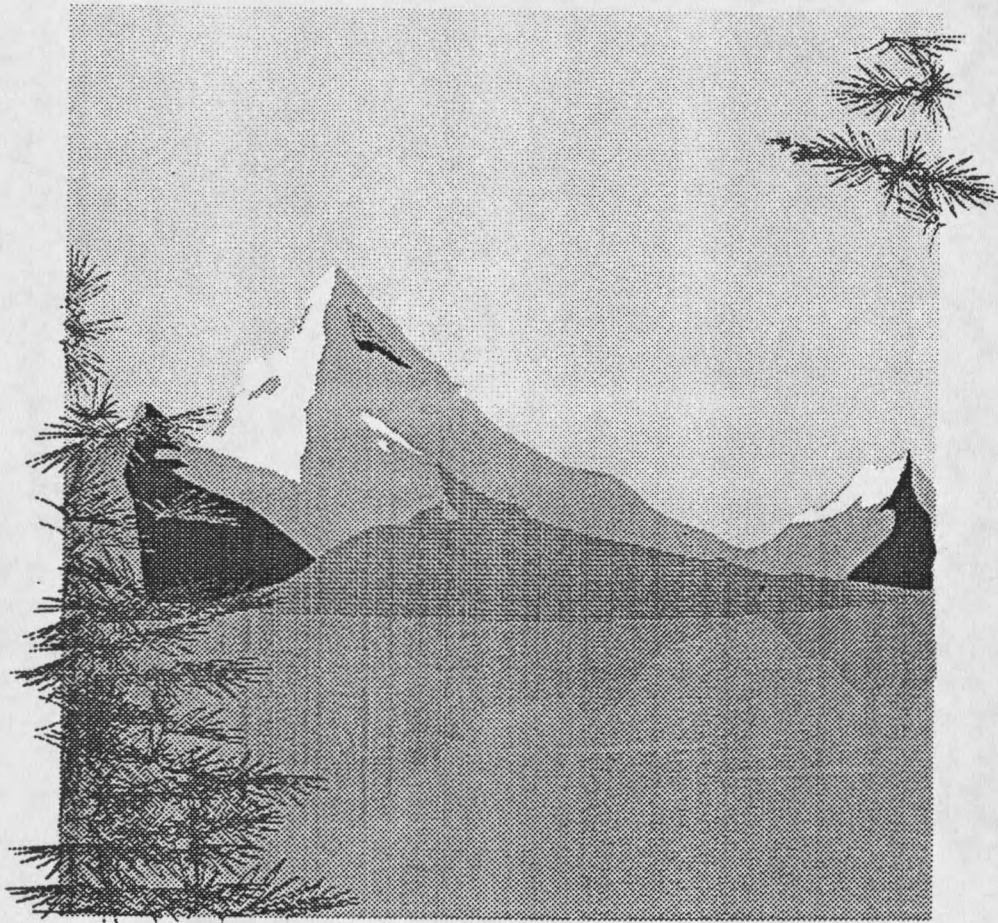
Milford Wearley, Ag-Ed Instr.
1551 8th Lane NW
Choteau, MT 59422



Rep. «First Name» «Last Name»
«Home Address»
«City», MT «Zip»

APPENDIX C
SURVEY INSTRUMENT

The Agriculture Awareness of Montana's Leadership



**Agriculture Education
Montana State University**

June 1996

Survey Information

This survey is comprised of three sections.

Section I relates to general information about agriculture, food, and food production.
 Section II relates to your general perceptions of agriculture, food, and food production.
 Section III requests demographic information about respondents.

All responses to the survey will be kept confidential and should be recorded on this survey.

After completing each of the three sections, please return this survey in the enclosed self-addressed stamped envelope.

Section I

Directions: Read each statement completely. Mark "T" if you think the statement is TRUE or mark "F" if you think the statement is FALSE. If you DON'T KNOW whether the statement is true or false, then mark "DK" in the answer column to the left of the statement.

EXAMPLE:

	True	False	Don't Know
U.S. farms are smaller than those in Europe.	T	F	DK

If you think the statement is FALSE, then circle the letter "F."

Statements

- | | |
|--|--------|
| 1. There are more farmers in the U.S. than there were 10 years ago. | T F DK |
| 2. Less than 3 percent of the U.S. gross national product is from agriculture. | T F DK |
| 3. Soil erosion does <u>not</u> pollute U.S. lakes and rivers. | T F DK |
| 4. The use of pesticides has increased the yield of crops. | T F DK |
| 5. Animal health and nutrition are important to farmers. | T F DK |
| | |
| 6. Food safety is a major concern of the food processing industry. | T F DK |
| 7. Processing increases the cost of food products. | T F DK |
| 8. U.S. research has improved farming methods in other countries. | T F DK |
| 9. One of every five jobs in the U.S. is related to agriculture. | T F DK |
| 10. Many farmers use tillage practices that conserve the soil. | T F DK |
| | |
| 11. Plant products are the main source of human foods. | T F DK |
| 12. Animals can be a valuable source of medical products. | T F DK |
| 13. Homogenization uses heat to kill bacteria in milk. | T F DK |
| 14. The U.S. does not sell its feed grains on the world market. | T F DK |
| 15. Thousands of people in the world die of starvation each year. | T F DK |
| | |
| 16. Local laws and regulations have little effect on farmers. | T F DK |
| 17. Farming and wildlife cannot survive in the same geographic area. | T F DK |
| 18. Biotechnology has increased the pest resistance of plants. | T F DK |
| 19. Animals eat foodstuffs that cannot be digested by humans. | T F DK |
| 20. New products have been developed using surplus grains. | T F DK |

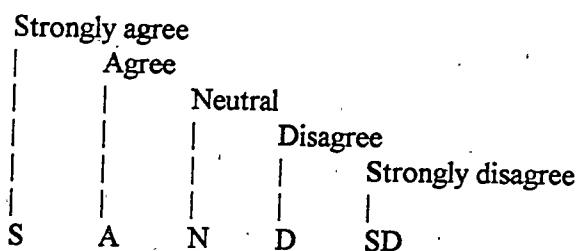
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- | | |
|--|--------|
| 21. Grain exports are usually transported between continents by airplane. | T F DK |
| 22. The average U.S. farm is larger than 500 acres. | T F DK |
| 23. U.S. agricultural policies influence food prices in other countries. | T F DK |
| 24. Animal wastes are used to increase soil fertility. | T F DK |
| 25. Profits increase as farmers strive for the maximum crop yields. | T F DK |
| | |
| 26. Biotechnology has increased animal production in the U.S. | T F DK |
| 27. Pasteurization uses heat to kill bacteria in milk. | T F DK |
| 28. An efficient food distribution system is essential to the agricultural industry. | T F DK |
| 29. Several countries depend on U.S. agricultural exports for food and fiber. | T F DK |
| 30. Government subsidy payments to farmers are used to stabilize food prices. | T F DK |
| | |
| 31. Water, soil, and minerals are important in agriculture. | T F DK |
| 32. Very little of the grain produced in the U.S. is exported. | T F DK |
| 33. Hamburger is made from the meat of pigs. | T F DK |
| 34. Using grain alcohol for fuel reduces the U.S. dependence on foreign oil. | T F DK |
| 35. Transportation and storage effects the supply of agricultural products. | T F DK |

Section II

Directions: Read each statement completely. Circle the letter symbol which corresponds to your response to each statement on the answer sheet provided. Use one of the following letters to represent your response.

EXAMPLE: All farmers live beyond their means.



If you **DISAGREE** with the statement, circle the letter "D".

Statements

- | | |
|---|------------|
| 36. U.S. citizens spend a higher percent of their income on food than in other countries. | S A N D SD |
| 37. Agriculture employs a large number of people in this country. | S A N D SD |
| 38. Pesticides can be used safely when producing food. | S A N D SD |
| 39. Organic production methods are a realistic alternative to using pesticides. | S A N D SD |
| 40. Confinement is an acceptable practice when raising livestock. | S A N D SD |
| 41. Consumers prefer processed foods to raw products. | S A N D SD |
| 42. Developing countries need help to be able to store food safely. | S A N D SD |
| 43. People are moving away from rural areas due to changes in agriculture. | S A N D SD |
| 44. Farmers earn too much money. | S A N D SD |
| 45. Not all land is suitable for farming. | S A N D SD |

46. Biotechnology has increased the yield of crops in developing countries. S A N D SD
47. Farmers take good care of their animals. S A N D SD
48. Processing adds value to farm products. S A N D SD
49. Farmers should develop new and innovative marketing strategies. S A N D SD
50. A strong agricultural industry is more important than military power. S A N D SD
51. Agricultural exports help to reduce the U.S. trade deficit. S A N D SD
52. Agricultural practices are harmful to the environment. S A N D SD
53. Raising hybrid plants results in higher yields. S A N D SD
54. Farmers are concerned about the humane treatment of animals. S A N D SD
55. Processing food products is a benefit to consumers. S A N D SD
56. The U.S. should allow free trade with other countries for food products. S A N D SD
57. The world food supply has increased as a result of improved technology. S A N D SD
58. The U.S. needs a steady supply of food and fiber goods to remain strong. S A N D SD
59. Only organic methods should be used to produce food. S A N D SD
60. Farmers should not use chemicals in crop production. S A N D SD
61. Animals have the same rights as people. S A N D SD
62. Processing adds more to the cost of food than the raw product. S A N D SD
63. Farmers have no control over food prices. S A N D SD
64. Developing countries lack the ability to produce enough food. S A N D SD
65. The government should exert more control over farming. S A N D SD
66. Agriculture is the greatest polluter of our water supplies. S A N D SD
67. Agriculture has become too mechanized. S A N D SD
68. Animals should not be used for food. S A N D SD
69. Farm grains are becoming an important energy source in the U.S. S A N D SD
70. Developing countries need help in distributing food among needy people. S A N D SD

Section III

Directions: Read each statement in this section completely. Circle the most accurate response to each statement.

EXAMPLE:

What is your age?

- a. 21-40 years b. 31-60 years c. over 60 years

If you are 37 years of age, you circle the letter "B."

71. Gender: a. Female b. Male
72. Where is your home located? a. Farm b. Rural area c. Town/City
73. How many years experience do you have in the legislature? a. 0 - 5 years
b. 6-10 years
c. 11-15 years
d. 16-20 years
e. 21 plus years
74. What is the population of the town closest to your home? a. under 2,500
b. 2,501 - 10,000
c. 10,001 - 25,000
d. 25,001 - 100,000
e. over 100,000
75. If you live on a farm or ranch, how many acres are included in your operation? a. Do not live on a farm/ranch
b. 10 - 50 acres
c. 50 - 100 acres
d. 501 - 1000 acres
e. over 1000 acres
76. Do you have relatives who live or work on a farm? a. YES b. NO
77. Do you have relatives who work in an agricultural business? a. YES b. NO
78. Did you take agricultural courses in high school? a. YES b. NO
79. Were you a member of FFA? a. YES b. NO
80. Were you a member of 4-H? a. YES b. NO
81. Are a considerable portion of your constituents involved in agriculture? a. YES b. NO

82. Rate the current ability of the following state groups to educate Montanans about our food and fiber system and environmental issues. (1= poor ability - 7=excellent ability)

	<u>Poor</u>	<u>Good</u>	<u>Excellent</u>				
a. Extension Service	1	2	3	4	5	6	7
b. College of Agriculture at MSU	1	2	3	4	5	6	7
c. Montana Department of Agriculture	1	2	3	4	5	6	7
d. Ag in Montana Schools	1	2	3	4	5	6	7
e. Public Education Agricultural Education Programs	1	2	3	4	5	6	7
f. Farm/Ranch Interest Groups (i.e., Farm Bureau)	1	2	3	4	5	6	7
g. University/USDA Research Stations	1	2	3	4	5	6	7
h. Other _____	1	2	3	4	5	6	7

83. In the future how important will the following groups be in educating Montanans about our food and fiber system and environmental issues. (1=no importance - 7=very imp.)

	<u>No Imp.</u>	<u>Imp.</u>	<u>Very Imp.</u>				
a. Extension Service	1	2	3	4	5	6	7
b. College of Agriculture at MSU	1	2	3	4	5	6	7
c. Montana Department of Agriculture	1	2	3	4	5	6	7
d. Ag in Montana Schools	1	2	3	4	5	6	7
e. Public Education Agricultural Education Programs	1	2	3	4	5	6	7
f. Farm/Ranch Interest Groups (i.e., Farm Bureau)	1	2	3	4	5	6	7
g. University/USDA Research Stations	1	2	3	4	5	6	7
h. Other _____	1	2	3	4	5	6	7

84. Through which of the following media do you normally receive your agriculture information?

- | | |
|-------------------|---------------|
| a. News magazines | c. Radio |
| b. Newspapers | d. Television |

85. Rank (1 through 6 or 7) the following issues according to which you think is most critical to address? (Use each number once) (1= Most Critical - 6 or 7= Least Critical)

- _____ Food safety
- _____ Animal welfare
- _____ Agriculture practices that affect the environment
- _____ Viability of our rural economic base
- _____ Conservation of our natural resource base
- _____ Biotechnology
- _____ Other (Please list) _____

THANK YOU FOR YOUR TIME!

APPENDIX D
COMMENTS ON QUESTIONS AND STATEMENTS

Written Comments on Survey Instrument

The following numbers indicate a comment about that numbered statement on the survey instrument. Certain demographic areas provided the respondents an opportunity to list additional information.

1. How defined? "Farmers"
3. Sediments are not necessary pollution.
4. For the short term.
5. /Ranchers
6. I hope!
19. Dumb question.
22. in Montana
24. At the Hutterites.
25. Not always.
32. Subjective
"very little" meaning? Quantify.
34. Somewhat
Not much
35. Affects not effects
40. What kind? Pigs?
52. Some, yes. All, no.
Some are.
54. Yes and no.

66. Non-point
One of the great
78. University
81. But they all eat.
82. Note--I am making rating based on how much public contact I have personally seen. Best spokesman I have see for ag in Montana is Taylor Brown and his news show.
- 82h. 4-H - Kids and Fairs
Radio - Ag news
Public information programs
83. Depends on funding.
This depends on the efforts made. Any of the groups could be important, but will they?
- 83h. 4-H and Fairs - the best
Public information programs
84. E. Farmers
E. Talking with Ranchers and Farmers.
- 85h. Wife
- 85g. Adverse affects of free trade
Import/Export/Free trade issues. Transportation costs.
Noxious weed control
Weed control
Education of Public about ag.
Unknown
- 85e. How do you define conservation?

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