Iowa farmers' use of mass media and interpersonal sources to obtain agricultural information

by

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DEDICATION

Dedicated

To Autumn Nicole Sanders,

born December 21, 1990

who kicked me everytime

I needed it.

CHAPTER I. INTRODUCTION

> Communication is the basis of all social life. The more complex society becomes the greater the need for precise communication at an increasingly high level of abstraction. Life in the rural community, where most Americans lived some years ago involved relatively simple processes of communication. Now, however, we are living in a dynamic and rapidly expanding society. The problem today for the communicator is one of knowing the likes and dislikes; the behavior patterns of his audience or receivers (McGrath, 1948, p. 5).

In addressing the problem of communicating agricultural information, the Smith-Lever Act of 1914 established the Cooperative Extension Service. The primary purpose of the Extension service was "to diffuse among the people useful and practical information on subjects relating to agriculture and home economics" (Awa and Van Crowden, 1978). The process of diffusing information was conducted basically through face-to-face or interpersonal communication.

Today interpersonal communication is just one of the major sources of communication used in the process of diffusing agricultural information. Interpersonal communication, along with mass media, extension services and advanced communication techniques serve as major communication systems that provide farmers with information about farming ideas.

The general purpose of this thesis is to identify information sources farmers use to obtain agricultural information. Farming is a business that requires a variety of information. Price and

supply information, developments in soil, crop and livestock science and mechanics, and many others are required for a successful farm operation. A lack of information in these areas could cause great income loss for a farmer who is not aware of recent changes and developments.

The main objective of this thesis is to determine the mass media and interpersonal sources used most often by Iowa farmers to obtain information for agricultural purposes. Another objective is to determine the effect of age, education, income, off-farm employment and new technology adoption on farmers' use of information sources.

This study investigates Iowa farmers' use of mass media and interpersonal sources during the years of 1982, 1984 and 1989. The analysis offers a means by which agricultural institutions can determine effective ways of communicating to farmers when diffusing new farming ideas and agricultural innovations. It offers a means of directing communication to specific audiences. This study also investigates whether Iowa farmers' use of these information sources has changed over time.

CHAPTER II. LITERATURE REVIEW

This chapter presents factors that may have changed in the past 30 years in where, when and how farmers get their information. Literature is presented on studies conducted on farmers' informational source use and the relationship between socio-economic characteristics and farmers' use of informational sources. Comparisons are made between findings of earlier studies and more recent studies to determine whether results have changed over the years. Hypotheses derived from these studies are also presented.

Factors Affecting Farmers' Information Seeking

New Technologies

As means of communicating change, farmers' ways of obtaining information have changed. Communication techniques (newspapers, magazines, radio, television, etc.) replaced or complemented communication of ideas and information by word of mouth between friends, neighbors and other personal contacts and created what researchers considered a "communication problem."

Researchers were concerned about how farmers were utilizing information sources. To study this problem, researchers considered it necessary to investigate the mass media and the ways in which they were being used by farmers. Researchers found instances where the new communication techniques replaced the traditional means of communicating interpersonally.

In a study of farmers' communication patterns, Wilkening (1950) found situations where farm papers and magazines replaced word of mouth or interpersonal communication. Research has also shown that the development of new communication techniques has, in some ways, supplemented interpersonal communication.

Today, development of new technologies continues to be a factor affecting the ways in which farmers obtain agricultural information. One recent development in agricultural communication technology is the videotex information delivery system. In a United States Department of Agriculture (USDA) report (Case, 1981), the videotex system was described as a "computer-based system that utilized telephone lines, cable, or other transmission channels to deliver information, in the form of text and graphic displays, to home television sets. Videotex subscribers use a keyboard or keypad to order specific items or 'frames' of information they wish to see. The 'menu' of information in general-purpose videotex systems ranges from newswires and reference information (e.g., almanac, encyclopedia) to entertainment and travel directories and shopping catalogs."

The agricultural community of Shelby and Todd counties of the state of Kentucky was the first to be introduced to the videotex system in March 1980 through a project called "Green Thumb Box," which was conducted by the Cooperative Extension Service of the state of Kentucky; Extension Service, U. S. Department of Agriculture; and National Weather Service, U. S. Department of Commerce.

The project was a test of a videotex system designed to provide better weather and market information to farmers and farm families.

In 1984, Iowa was introduced to a teletext communication system called AGRI-VIEW. The teletext system is considered the sister to the videotex system because both systems use computers and telecommunications technology to deliver information as electronic text or graphics on terminals or television screens.

Recent research found that users of the teletext system possessed the same characteristics as users of the videotex system. In a study of Iowa farmers' use of AGRI-VIEW, Pfannkuch (1988) found that the farmers who used the system were young and possessed high education and income levels. These findings seem to suggest that new technologies are more likely to be used by individuals who are younger, more educated, and have higher income.

Abbott (1989), in his study of three teletext and videotex information systems, AGRI-VIEW, Dataline and Exnet, found that the systems are being used by younger and higher income farmers. Farmers with gross farm incomes of less than $100,000 did not use the systems; however, those farmers with gross income of $100,000 or more, chose the systems as their best source of agricultural options information.

Although new technology is a factor affecting farmers' ways of seeking information, such factors as off-farm employment, specialized magazines and education are also important.

Off-farm Employment

> Banks and Kalbacher (1981) reported that "at the same time that farm employment levels dropped, rural areas began to experience significant increases in off-farm job opportunities. Today's rural residents, whether they live on farms or not, are more likely to be working in nonagricultural industries than in farming. But when employment data were first collected (1820), three-fourths of the rural workforce was employed in agriculture. Since then, the proportion of farm operators working off their farms has risen steadily. Although by 1929 only 30 percent of all farm operators reported any off-farm work, by midcentury the proportion rose to nearly 40 percent, and by 1974, 55 percent reported some off farm work."

Banks and Kalbacher (1981) also reported that in May, 1976, more than 800,000 multiple jobholders, one-fifth of the national total, had at least one agricultural job. They explained that these individuals were primarily nonagricultural wage and salary workers who operated their own farms as a secondary job.

In 1971, Sundquist found that the proportion of farm family income which came from nonagricultural sources was growing. Sanders (1977) stated that the projected expansion of nonmetro industries and businesses is a possibility as nonfarm employment increases.

Off-farm employment affects where, when and how farmers get information. Because of time spent on the job, neighbors, friends and relatives may coexist or be replaced by coworkers as major sources of information.

Specialized Media

Information received from specialized sources tends to concentrate on a single topic or a group of related topics. Individuals providing this information are considered experts who may require a fee for their services; therefore, information from specialized sources can be obtained by individuals who can afford it.

Another characteristic that may distinguish specialized sources from other sources is that they are directed towards those individuals with higher education levels. Merrill and Lowenstein (1971) explained that as an individual becomes more educated, he becomes more individualized. "When a sizable proportion of the population goes on to university education, individuals leave the homogeneous education path and begin to follow new trails. Specialized literary, scientific, and professional interests are cultivated and developed" (Merrill and Lowenstein, 1971).

Evidence indicates that 30 years ago specialized print media existed concurrently with general print media. All of the best known print media (Life, Look) were considered general. Because of urbanization, competition with television and rising levels of literacy in the United States, printed media evolved from a colonial press to a penny press to a specialized press.

By the beginning of the 1970s, Life and Look were the only two general magazines remaining in the United States. The two magazines that were already specialized were TV Guide, an example of "unit specialization," and Reader's Digest, an

example of "internal specialization."

"Unit specialization" refers to a publication that appeals to an audience with a common interest. "Internal specialization" refers to a publication that offers a wide variety of articles from which a heterogeneous audience can select items of particular interest (Merrill and Lowenstein, 1971).

In the agricultural community, farm magazines did exist over 40 years ago but were not categorized as being general or specialized. They provided information to a homogeneous farm population. As farmers became more interested in higher educational attainment, farm information sources were forced to develop special means of providing information to a farm population that was becoming more heterogeneous.

Specialized media that are available to Iowa farmers are specialized magazines such as Feed Stuffs, Hog Farm Management, Crops and Soil; dealers's magazines such as Farm Profit, Ford Farming, The Furrow; university Extension bulletins; private information management and newsletters such as Doane's or Pro Farmer; and computer information services.

Discussion

New technology, off-farm employment, rise in education and proliferation of specialized media all seem to have had an effect upon the agricultural community. That effect is more prevalent

when the community is categorized as low status or high status. This has created, in what was once an interpersonal society, social barriers among the farmers. Most lower status farmers will not associate with the higher status farmers. Lionberger (1949) stated that part of the isolation experienced by lower income farmers is a function of social distances which restrict free and spontaneous association and which causes the so-called "little farmer" to feel that he has little in common with his "big farmer" neighbor.

This not only causes problems of communication among farmers, but it is apparent in the diffusion attempts made through new technologies and Extension personnel. Small farmers are not using the new technologies and many are not aware of their existence.

New agricultural communication technologies are more readily adopted by higher status farmers than lower status farmers for obvious reasons. Higher status farmers have the necessary income, educational attainment and contacts to become aware of new advances in the agricultural community.

Sources of Information, Age and Socio-Economic Status

Research has generally indicated that information-seeking is complex and multifaceted. It has been found that a farmer's level of information use differs by selected farm and personal characteristics.

Past research has shown that certain personal and farm characteristics are associated with high rates of information use. Bultena et al. (1984) found that information use is related to several personal and farm characteristics. He stated that high information users are younger, have more education, operate larger farms and rent more of their total acreage.

Age

As people become older, they tend to become more conservative and their priorities change. This in turn, affects their information seeking behavior.

Yarbrough et al. (1970) reported that age is thought to influence behavior. They explained that an individual's generation reflects his or her socialization process and is an important determinant of the beliefs, attitudes and behavioral patterns of the individual.

In a study of media use and the life span, Dimmick et al. (1981) found evidence of a curvilinear relationship between age and information use. The use of media for information gradually rose with age and began to decline just after retirement. This downward trend was attributed to finding little information of interest.

Rogers and Svenning (1969) found a negative correlation between age and mass media exposure in their Colombian study. They found that older farmers, who were likely to have relatively low levels of education, seemed to attend less to mass media. It

was also found that older people used media less for information. The same relationship was found in Rogers et al. (1985) Beijing study. This finding was attributed to the lack of education.

The same results that Rogers et al. (1985) found in their Beijing study were found in Lionberger's (1955) study of the information-seeking habits and characteristics of families in Missouri. He found that users and nonusers of institutionalized sources of information possessed different characteristics: users of information were younger than nonusers and they had more education than nonusers.

In the Vermont Extension study, research was directed toward determining the socio-economic status of farmers who used information sources for agricultural purposes. It was found that farmers more than 30 years old reported farm papers and magazines, the Extension Service, and their friends and neighbors as their usual sources of information. Farmers under 30 reported the same except for Extension. Farmers over 60 relied less on the printed materials and personal sources, while most often using the Extension Service (USDA, 1947).

These studies suggest that younger farmers use information sources more often to obtain agricultural information; however, most recent research suggests that the trend is different for newspapers. From a 1987 national newspaper readership study, Bogart (1989) reported that a smaller proportion of adults under 30 were reading the newspaper than in recent past. He found that

the frequent readers of newspapers were older than the infrequent readers. Bogart explained that because of a higher educational attainment among young people, it would seem to promise a substantial increase in the level of newspaper reading. This has not taken place.

Therefore, it is hypothesized that younger farmers will utilize the information sources (except newspapers) more often than the older farmers.

Socio-economic Status

Reasons for associating status and source of information lie in the relationship of socio-economic status with other factors. As explained by Wilkening (1950), those of higher socio-economic status have the means, as well as the desire, for contacts with the formalized sources of information. Perhaps of greater importance is that one's level of knowledge and acquaintance with the social and material world about him and his attitudes toward the objects in his world are closely associated with one's socio-economic position.

Wilkening (1950) found that farmers of higher socio-economic status tend to utilize agricultural agencies, while those of lower socio-economic status tend to utilize sources that require personal contact (relatives, neighbors, and dealers).

Braden (1981) stated that it is often assumed that with some education, cash, and motivation, an individual is likely to read newspapers and magazines.

This thesis concentrates on the relationship between the socio-economic position (education and income) of the farmer and the use of information sources.

Education

America is experiencing a national increase in educational attainment. Banks and Kalbacher (1981) stated that "compulsory school attendance laws, rising socioeconommic status, and changing norms concerning the value of education" are the factors contributing to the concern of obtaining advanced education. Elementary and high school education are basically uniform throughout the nation; however, a great number of people are seeking education beyond high school.

In the agrarian sector of the nation, education of farm operators has risen rapidly. In keeping with this trend, Iowa farmers have also shown evidence of higher educational attainment. In 1963, Thomas Clark Jetton studied the conditions of entry into farming in Iowa from 1959 to 1960. From the study he found that the educational data indicated that the median grade completed by the respondents was 12 years or a high school education with 66 percent reported completing this grade level. More than 27 percent reported having eight or fewer years of education and less than five percent reported four or more years of college.

Farmers with less formal education find it difficult to compete with better educated farmers. Higher educational attain-

ment serves farmers in different ways. Those farmers who are engaged in full-time management of the farm are involved in an industry that is very competitive and complex. Higher levels of education are needed to gain the scientific and managerial competence demanded by modern agriculture.

Farmers who work on the farm part-time while working off-farm jobs require higher educational levels which would prepare them for nonagricultural occupations.

Fratoe reported (1979) that, during 1968-1975, the number of college graduates among younger male farm laborers rose from 0.4 to 4.0 percent of all younger male farm laborers.

Education is an indication of an individual's formal socialization. Part of the education process is to improve an individual's problem solving ability. Education provides the study habits, reading skills and the vocabulary for those desiring to read and understand.

Education enhances the ability to achieve a higher level of occupation, income, and social status. However, there are studies indicating that not only does education increase socio-economic status, but it also increases mass media use.

Rogers et al. (1985) Beijing audience survey found that media exposure is greater among those with higher levels of formal education. Samuelson et al. (1963), in their study of education, time, and use of mass media, found a positive relationship between education and mass media use. Rogers and Svenning (1969) also found a positive relationship between education and mass media use

in his study of Colombian peasants.

Other studies indicate that in any study of relationship, education can be expected to be related to major communication variables.

Lazarsfeld and Kendall (1948), in their study of radio listening in America, and MacLean (1952), in his study of cities, villages, and farms, found that the more educated people used print media more and used broadcast media less than less educated people.

Rogers et al. (1985) found that individuals with less than a high school education reported that radio was important.

Davidson (1976) stated that the more highly educated people are, the more they rely on print media for information. In his research on mass media's systems and effects, he found that the better-educated people read newspapers more than less educated.

In the Vermont study (USDA, 1947), researchers found that those farmers of higher educational levels usually obtained a higher proportion of their agricultural information from farm papers and magazines, while those of a lower educational level obtained information from friends, neighbors and family members.

These studies suggest that the more educated farmer will obtain his information from the printed media. It is hypothesized that farmers of higher educational levels will utilize general farm magazines, specialized magazines and newspapers more often than those with lower educational levels.

Income

The income level is thought to show a number of characteristics. Income might be an indicator of the individual's generation and longevity and the time an individual has been in the marketplace earning wages and advancing in occupational status.

Davidson (1976), in his study of mass media's systems and effects, found lower income groups watched television more than higher income groups. However, he found a positive correlation between income and newspaper use. He found that those with higher incomes read newspapers more than those with lower incomes.

Other communication researchers have found positive correlation between income and print media use.

Rarick (1973), in his study of the Mansfield News Journal, found that people with a high level of income were more likely to be News Journal subscribers than were those at a lower level.

Westley and Severin (1964), in their study of the daily newspaper nonreader, found that 93% of the respondents who were members of households headed by persons earning $10,000 or more were daily newspaper readers. These studies show that there is a positive relationship between income and mass media. It will be the purpose of this study to determine if there is a positive relationship between Iowa farmers' income and their use of information sources.

Research on Farmers' Use of Information Sources

In conducting a literature search for studies that concentrated on farmers' information seeking habits, it was found that the data gathered in this area were basically obtained through two different methods. One method was to ask respondents a direct question concerning the sources from which they obtained agricultural information. The choice of information sources usually included mass media and interpersonal sources. The other method of measuring farmer information source use was by asking the question concerning where farmers obtain information about specific farm practices. These practices included farm matters such as hog production, soil fertilization, etc.

The two questions can lead to different results. The question concerning specific practices has been found to produce replies directed toward personal sources of information, while responses from the more general question were directed toward other sources (often times printed sources).

Researchers using the general question to determine information source use found that printed materials were a more common source for farmers to obtain agricultural information.

In 1947, the United States Department of Agriculture (USDA) conducted a study of the Vermont Extension Service. The purpose of the study was to determine the effectiveness of Extension work among full-time farmers through three major aspects. One of those aspects, which is related to this thesis, examined the media

through which information is channeled to farm people and ascertained which media the farmers used most frequently. It also examined the effectiveness of several selected media in getting ideas across to farmers and the farmers' opinions as to the best media through which information can be channeled to them.

Farmers were asked about their use of different information sources (farm papers, radio, magazines, newspapers, friends, neighbors, agricultural agents) to obtain new ideas about farming. Forty-eight percent of the farmers reported that farm papers and magazines were their major sources of agricultural information, while 34% reported Extension services, 21% reported friends and neighbors, 11% said they originate their own ideas, 6% reported radio, and 4% reported other government agencies.

Wilkening (1950) argued that if the researchers of the Vermont study had stated specific practices, as he did, the replies would have been different. He predicted that the responses would have been directed more toward personal sources of information. In the study conducted by Wilkening (1950), he asked for primary sources of information for specific farm practices such as fertilizing corn, using hybrid corn, using purebred livestock, etc. His research analyzed the information sources reported, for improved farm practices, by farmers in a North Carolina community. The study addressed the importance of different sources of information concerning farm matters and the influence of socio-economic status upon the utilization of information sources.

Wilkening found that other farmers (27.8%) and the Extension Service (25.9%) were reported about equally as the main sources of information for improved farm practices. Dealers (16.0) were the third most important sources and then followed mass media (7.3%).

Dickerson (1955) conducted a communications study which determined the characteristics of farmers living in a county of New York who used different media for obtaining information on new farm practices. The respondents were asked, "In general, where do you usually get helpful information about new things in farming?" The following sources were provided as possible responses: neighbors, friends and relatives, radio, newspapers, magazines, farm papers, Farm Bureau News, Farm Bureau meetings and demonstrations, individual talks with the county agent, circular letters from the county agent, Cornell bulletins, other bulletins, other agricultural agencies, salesmen and dealers, and agricultural teachers in school.

Eighty-two percent of the respondents reported that farm papers and printed Extension sources were helpful in obtaining information about farm practices. Seventy-nine percent reported radio, 63 percent reported neighbors, 55 percent reported oral extension, 42 percent said newspapers, 38 percent other agricultural agencies and 29 percent salesmen.

Herbert F. Lionberger used similar methods in his research concerning farmers' information seeking. In his studies, he asked for sources that were considered "most useful." This method of questioning produced responses of personal sources.

In his study of the information seeking habits and characteristics of families in Missouri (1955), he found that users and nonusers of institutionalized sources reported that personal sources (friends and neighbors) were their most useful source for obtaining farm information. Mass media (newspapers and magazines) ranked comparatively high with personal sources for both groups. Seventy-four percent of the users and non-users of institutionlized sources reported personal sources as their major source of farm information, while 57 percent reported mass media.

The same approach was taken by Lionberger in 1957 when he studied the social structure and diffusion of farm information in Missouri. To determine farmers' information source preference, respondents were asked the following question: "You have named _____, _____, _____, etc., as sources of farm information which you have found useful during the past year. Which of these have you found most useful?" Responses were classified as follows: (a) intimate associates included friends, neighbors, and relatives; (b) mass communication media included newspapers, magazines, and radio; (c) institutionalized sources included county agents, vocational agriculture teachers, farm organization meetings, farm bulletins, adult farm classes, adult educational and service agencies.

Lionberger found that 48 percent of the neighborhood residents reported that they preferred intimate associates, while 42 percent of the nonneighborhood residents reported mass media as

their preferred source. Responses for institutionalized sources were about the same, neighborhood (30%) and non-neighborhood (32%). Researchers argued that if respondents were asked to respond to a question concerning the sources used to obtain information about specific practices the responses would be directed toward personal sources.

In a study conducted in New York State, Awa and Van Crowden (1978) found that almost half of the farmers (42%) of Lewis county used magazines most often for agricultural information. Extension followed with 30%.

Braden (1981) studied the information needs and sources of small farm operators in Texas. He found that mass media sources (farm magazines, newspapers and publications) ranked highest as farmer's top sources of information. Respondents ranked ten different information sources -- farm magazines, newspapers, radio, television, publications (newsletters and bulletins), other farmers, farm supply businesses, county Extension offices and Extension meetings, other government offices, and vocational agricultural teachers.

Yancey (1982) conducted a study concerning the relationship between social class and availability, credibility and usage of communication media by farm families in five North Carolina communities. Farm operators were asked to name the information sources they used in making farm and home decisions. Information sources were categorized as mass media (radio, television, newspapers), publications (Farmers' Almanac, bulletins), or interpersonal

(family, friends, or neighbors, extension agent or other public source).

It was found that ninety-seven percent of the farm operators used interpersonal sources, 68 percent used publications and 59 percent used mass media for decision making.

Korsching, Hoban and Maestro-Scherer (1985) conducted a farm survey and Bultena, Hoiberg and Nowak (1984) studied sources for conservation information which found that the most often-used source of information among those farmers were other farmers and farm magazines, friends, relatives and peers.

In a study of New York farmers, Yarbrough (1988) found that most of the farmers obtained their information from Extension publications (80%) and general farm magazines (67%). He also found that 67% of the farmers talked to other farmers more often than they do dealers (35%), professionals and Extension personnel (20%) and researchers (3%).

Analysis of Studies

A comparison of the sources used by the older studies and sources used by more recent studies (see Table 1) show that personal sources and print media remained, over the years, the information sources most often-used by farmers to obtain information for agricultural purposes. However, printed sources appear most often as a source of information for the recent studies, whereas,

personal sources appeared most often for the earlier studies. It appears that there has not been a major change in farmers' use of information sources.

These findings suggest that the most often-used sources of agricultural information among farmers are the printed media and personal sources. These studies also suggest that the methodology used in studying farmers' information seeking plays a major role in determining responses. Different methods produce different responses; therefore, it is important to clearly define objectives and determine the method that would accomplish the chosen objectives.

This thesis will be concerned with determining the information sources Iowa farmers used most often to obtain agricultural information during 1982, 1984 and 1985. Considering the findings of the studies, the methods cited and the methodology applied to gathered data used in this thesis, it will be hypothesized that Iowa farmers use personal sources and the print media more often than any other sources to obtain agricultural information.

Summary of Research Studies

Taking the above findings into consideration, this study is designed to assess the mass media and interpersonal sources used by farmers to obtain agricultural information and to determine the relationship of the farmers' age, education and income to the use of information sources.

Table 1. Rank order comparison of sources used in studies.

Early Studies		
USDA (1947)	1. farm papers 2. magazines 3. extension services 4. friends/neighbors 5. radio 6. gov't agencies	
Wilkening (1950)	1. other farmers 2. extension services 3. dealers 4. mass media	
Dickerson (1955)	1. farm papers 2. radio 3. oral extension 4. newspaper 5. agricultural agencies 6. salesmen	
Lionberger (1955)	1. personal sources (friends and neighbors) 2. mass media (newspapers and magazines)	
Lionberger (1957)	**Neighbors**	**Non-neighbors**
	1. friends, neighbors, relatives	1. mass media
	2. institutionlized sources	2. inst. sources
	3. mass media	3. friends, etc.
Recent Studies		
Awa and Van Crowden (1978)	1. magazines 2. extension	
Braden (1981)	1. mass media 2. radio 3. television	
Yancey (1982)	1. interpersonal sources 2. publications 3. mass media	
Bultena et al. (1984)	1. farm magazines 2. other farmers, friends, peers	
Korsching et al. (1985)	1. farm magazines 2. friends, relatives, peers	
Yarbrough (1988)	1. extension publications 2. general farm magazines 3. other farmers 4. dealers 5. professionals/ extension personnel 6. researchers	

The following generalizations were drawn from the studies:

1. The mass media are used most often by farmers who are younger and more educated to obtain agricultural information.
2. Interpersonal sources are an important means of obtaining farm information for older farmers and those who are employed off the farm.
3. Print media and personal sources are the sources mentioned most often by farmers.
4. There is a positive relationship between education, mass media use, and interpersonal source use.
5. There is a positive relationship between income, mass media use, and interpersonal source use.
6. Age is negatively related to most mass media use; however, it is positively related to newspaper use.
7. New technologies are more likely to be used by farmers who are younger, more educated, and have higher income.
8. Young farmers utilize information sources more often than older farmers.

Hypotheses

Based on the research presented above, the following hypotheses were considered for testing.

Age

Past research has indicated that there is a relationship between age and information source use. Many studies found that those who use information sources were younger that those who did not use them. In support of this theory, Dimmick et al. (1981) found that the use of media for information increased with age and declined after retirement. The Vermont Extension Study found that younger farmers utilized information sources more than older farmers.

A recent study has indicated that a different trend exists for newspapers. It was found that those who read the newspapers were older, not younger.

General Hypothesis I: There is a negative relationship between age and most mass media use; however there is a positive relationship between age and newspaper use.

Specific Hypothesis Ia: The higher the age level of the farmer, the lower will be the farmer's use of:

i) general farm magazines
ii) specialized farm magazines.
iii) dealer magazines.
iv) farm organization publications.
v) university Extension bulletins.

vi) private information and management services.

vii) television programs about farming.

viii) radio programs about farming.

ix) computer services.

Specific Hypothesis Ib: The higher the age level of the farmer, the higher will be the farmer's use of newspapers.

General Hypothesis II: There is a positive relationship between age and interpersonal source use.

Specific Hypothesis IIa: The higher the age of the farmer, the higher the use of:

i) farmers in the county.

ii) farmers outside the county.

iii) extension personnel in county.

iv) extension personnel outside county.

v) farm equipment dealers.

vi) professionals.

Socio-economic Status

Past research has indicated that there is a relationship between socio-economic status and information source use. Bultena et al. (1984) found that farmers' information use differ by certain personal and farm characteristics.

In support of this theory, Wilkening (1950) found that farmers of higher socio-econmic status tend to utilize the formally organized sources of information, while those of lower socio-economic status tend to utilize those sources which are incidental to the everyday contacts of the farmer.

General Hypothesis III: There is a positive relationship between education and mass media use.

Specific Hypothesis IIIa: The higher the education of the farmer, the higher the use of:

i) general farm magazines.
ii) specialized farm magazines.
iii) dealer magazines.
iv) farm organization publications.
v) university extension bulletins.
vi) private information and management services.
vii) television programs about farming.

viii) radio programs about farming.

ix) newspapers.

x) computer services.

General Hypothesis IV: There is a positive relationship between education and interpersonal source use.

Specific Hypothesis IVa: The higher the education of the farmer, the higher the use of:

i) farmers in the county.

ii) farmers outside the county.

iii) extension personnel in county.

iv) extension personnel outside county.

v) farm equipment dealers.

vi) professionals.

General Hypothesis V: There is a positive relationship between income and mass media use.

Specific Hypothesis Va: The higher the income of the farmer, the higher the use of:

i) general farm magazines.

ii) specialized farm magazines.

iii) dealer magazines.

iv) farm organization publications.

v) university extension bulletins.

vi) private information and management services.

vii) television programs about farming.

viii) radio programs about farming.

ix) newspapers.

x) computer services.

General Hypothesis VI: There is a positive relationship between income and interpersonal source use:

Specific Hypothesis VIa: The higher the income of the farmer, the higher the use of:

i) farmers in county.

ii) farmers outside county.

iii) extension personnel in county.

iv) extension personnel outside county.

v) farm equipment dealers.

vi) professionals.

Off-farm Employment

Farmers' dependency on nonagricultural sources to support their family is increasing. Off-farm employment is becoming more common in the agricultural community. Because of the time spent

on the job, off-farm employment affects where, when and how farmers get information. Coworkers may replace or coexist with major sources of information.

General Hypothesis VII: There is a negative relationship between off-farm employment and mass media use.

Specific Hypothesis VIIa: Farmers employed off the farm will have low use of:

i) general farm magazines.
ii) specialized farm magazines.
iii) dealer magazines.
iv) farm organization publications.
v) university extension bulletins.
vi) private information and management services.
vii) television programs about farming.
viii) radio programs about farming.
ix) newspapers.
x) computer services.

General Hypothesis VIII: There is a negative relationship between off-farm employment and interpersonal source use.

Specific Hypothesis VIIIa: Farmers employed off the farm will have low use of:

i) farmers in county.

ii) farmers outside county.

iii) extension personnel in county.

iv) extension personnel outside county.

v) farm equipment dealers.

vi) professionals.

New Technology Adoption

New technology adoption is a factor affecting farmers' information seeking patterns. Research shows that those farmers who adopt new technologies tend to be younger, more educated and have higher income; therefore, they tend to utilize information sources that are more specialized.

General Hypothesis IX: There is a positive relationship between new technology adoption and mass media use.

Specific Hypothesis IXa: Farmers who adopt new technology will have a high use of:

i) general farm magazines.

ii) specialized farm magazines.

iii) dealer magazines.

iv) farm organization publications.

v) university extension bulletins.

vi) private information and management services.

vii) television programs about farming.

viii) radio programs about farming.

ix) newspapers.

x) computer services.

General Hypothesis X: There is a negative relationship between new technology adoption and interpersonal source use.

Specific Hypothesis Xa: Farmers who adopt new technology will have low use of:

i) farmers in county.

ii) farmers outside county.

iii) extension personnel in county.

iv) extension personnel outside county.

v) farm equipment dealers.

vi) professionals.

In the study of the relationship between age, education, income, off-farm employment, new technology adoption, and information source use, age, education, income, new technology adoption and off-farm employment will be the independent variables and information source use and will be the dependent variable.

CHAPTER III. METHODOLOGY

Data for this survey were taken from the Iowa farm computer survey that has been conducted every year since 1982 by the Iowa State University (ISU) Department of Journalism and Mass Communication with support from Iowa State University Agricultural Experiment Station's Projects 2514 and 2725. The data from 1982, 1984 and 1989 will be used in this thesis.

Dr. J. Paul Yarbrough began the farm computer study in 1981. Dr. Clifford Scherer was the project director beginning in January, 1983 until his departure in January, 1985. Dr. Eric Abbott is the current project director.

Sample Selection

The three samples were independent randomly-selected groups of farmers taken from a list of subscribers to Wallace's Farmer magazine. To collect data from these farmers, a 10-12 page mail survey questionnaire was developed.

The questionnaire was modified somewhat from year to year. However, the basic format of the questionnaire remained the same from 1982 through 1989 (a sample of the 1989 questionnaire can be found in Appendix B).

The mail survey basically followed the methodology recommended for mail surveys by Dillman (1978). The first questionnaire was sent by first class mail in January, February or

March of each year. A personnally addressed letter on departmental letterhead and a business reply envelope for returning the questionnaire were mailed to each respondent. About one week later, reminder postcards were sent to nonrespondents. About two weeks later, nonrespondents were sent a second personalized letter questionnaire and business reply envelope. After another two weeks, final reminder postcards were sent to those who had not returned the questionnaire.

The data bases for 1982, 1984, and 1989 were combined into one data base, by using SPSSPC, which produced a total n of 1546.

This thesis is not concerned with the computer adoption segment of this survey, but concentrates on the informational sources (mass media and interpersonal) used by those farmers.

Operationalization of Variables

Variables selected for this study were uniform for the three time periods. The following is the list of variables used in the study:

Age, education and income were chosen to represent the demographic variables for the study. Off-farm employment and new technology are dichotomous variables that are used as independent variables.

Age: To measure age, respondents were asked, "How old were you on your last birthday?" Respondents answered by filling in

_____ **years old.**

Education: To measure this variable, respondents were asked, "How many years of formal schooling did you complete?" Respondents answered by circling one number --- 1 (1-8 years, elementary school), 2 (9-11 years, attended some high school), 3 (12 years, graduated from high school), 4 (13-15 years, attended college), or 5 (16 or more years, graduated from college).

Income: This variable was measured by asking "Which of the income categories below best estimates your average gross income from the sale of farm products during the past three years?" The respondents chose from (1) under $20,000, (2) $20,000 to $39,999, (3) $40,000 to $99,999, (4) $100,000 to $199,999, or (5) $200,000 or more.

Off-farm employment: This variable was measured by asking, the "During the last year were you employed off the farm?" The respondents answered "Yes" or "No".

New technology adoption: This variable was measured by determining whether farmers own computers. They were asked, "Do you have a micro-computer?" The respondents answered "Yes" or "No".

Sources of Information: Questions on mass media and interpersonal use were asked to determine how frequently the respondents use these information sources. To measure this variable, it was divided into two sections.

The first section measured mass media by asking, "How often do you use each source to obtain helpful information about farming?"

Mass Media Sources:

a. General farm magazines (such as Wallace's, Farm Journal, Successful Farming).

b. Specialized farm magazines (such as Feed Stuffs, Hog Farm Management, Crops and Soil)

c. Dealer's magazines (such as the Furrow, Ford Farming, Farm Profit)

d. Farm organization publications (such as Farm Bureau Spokesman and NFO).

e. University Extension bulletins and newsletters.

f. Private information and management newsletters (such as Doane's or Pro Farmer).

g. Television programs about farming.

h. Radio programs about farming.

i. Newspapers.

j. Computer-based information systems (where you use a computer to obtain information) such as CompuServe, The Source or Instant Update.

Response categories:

Never	(0)
Sometimes	(1)
Often	(2)
Very Often	(3)

The second section measured interpersonal source use by asking, "How many times each month do you talk on a face-to-face basis about farming with each of the following?"

Interpersonal Sources:

a. Talk face-to-face with other farmers who live in your county.

b. Other farmers who live outside your county.

c. Extension personnel in your county.

d. Extension personnel outside your county.

e. Farm equipment or supply dealers, elevator personnel, salesmen, or buyers.

f. Professionals such as farm management consultants, veterinarians or bankers.

g. Researchers at a university or private business.

Response categories:

Almost Never (0)
1 to 2 Times (1)
3 to 6 Times (2)
7 to 14 Times (3)
15 or More (4)

General and Specialized Sources:

To measure general and specialized information source use scores were created for each group. Nibbelink (1990) used the same data set for study of Iowa farm families' computer use patterns in which she created scores for general and specialized agricultural information groups. The scores were created by adding response scores for individual items together. The coding

was no points for never, one point for sometimes, two for often and three points for very often.

The variables included in the subset score for the seeking of general agricultural information included using general farm magazines, using farm dealers' publications, using farm organization publications, following television farm programs, listening to farm radio programs, reading farm information in newspapers, talking face-to-face with other farmers, talking to farmers outside the county and talking to equipment dealers. The reliability for this score was an alpha of .7391 (Nibbelink, 1990).

The variables included in the subset score for the seeking of specialized farming information included using specialized farm magazines, using extension bulletins, using private newsletters, attending coop extension meetings, talking to county extension people, talking to extension people outside the county, attending farm supply company meetings, using other government agencies and talking to professionals. The reliability for this score was an alpha of .7491 (Nibbelink, 1990).

Created from the subset score for general agriculture information sources were general mass media and general interpersonal sources. The general mass media sources include general farm magazines, farm dealers' publications, farm organization publications, television programs, radio programs, and newspapers. The general interpersonal sources include other farmers, farmers outside the county, and equipmemt dealers.

Created from the subset score for specialized agricultural information sources were specialized mass media and specialized interpersonal sources. The specialized mass media sources include specialized farm magazines, extension bulletins and private newsletters. The specialized interpersonal sources include county extension people, extension people outside the county and professionals.

Analysis

To assess the contribution that each variable made to the study, mean, chi-square and multiple regression analyses were performed. The analyses focused on mass media and interpersonal source use, the effect of age, education, income, off-farm employment, and new technology adoption on the use of mass media and interpersonal sources, the effect of age, education, income, off-farm employment and new technology adoption on the use of general and specialized mass media and interpersonal sources.

Mean analysis

Mean analysis is used when one number is needed to represent a group of numbers. The mean is the average score of a set of scores. It is represented by the X.

The mean analysis was used to test the hypotheses concerning interval demographic variables and the use of mass media and interpersonal sources.

Chi-square analysis

Chi-square indicates whether there is a statistically significant relationship between nominal variables. A chi-square test compares the observed distributions with those which would be expected if there were no relationship between the variables (Fitz-Gibbon and Morris, 1978).

To obtain the chi-square for the variables, crosstabulation tables were constructed. The crosstab procedure produces tables showing the joint distribution of two or more variables. Cell counts, cell percentages, expected values, residuals and various measures of association can be obtained (Norusis, 1988).

Chi-square was used to test the hypotheses concerning off-farm employment, new technology adoption and the use of mass media and interpersonal sources.

Multiple regression analysis

Multiple regression analysis is a general statistical technique that analyzes the relationship between a dependent variable and a set of independent variables. The most important uses of the technique as a descriptive tool are:

1) To find the best linear prediction equation and evaluate its prediction accuracy.

2) To control for other confounding factors in order to evaluate the contribution of a specific variable or set of variables (Ramanathan, 1987 and Norusis, 1986).

The multiple regression analyses were used to determine the predictive powers of age, education, income, off-farm employment and new technology adoption in the use of general and specialized mass media and interpersonal sources.

CHAPTER IV. FINDINGS AND DISCUSSION

The purpose of this chapter is to report the findings regarding the hypotheses stated in Chapters II and III by using specific empirical measures and data reported in Chapter III.

The findings of the study are presented in four major sections. The first section presents the descriptive analysis of the respondents and an examination of the distribution of selected variables.

The second section presents the testing of the hypotheses by using chi-square and mean analyses.

The third section deals with the multiple regression analyses of the variables.

Section I. Description of Respondents

Age

It is important to determine at what age a person is considered "older." America has classified persons of the retirement age of 65 as older. Lumpkin (1984) tested the validity of the classification by using a national probability sample. His data analysis showed that there was a significantly distinct difference of those 65 and over from those who were 55-64 years old. The same classification has been used in this study to categorize people into age groups.

The socio-economic information collected provides a description of those who responded to the surveys. The ages reported by the respondents have been catergorized and presented in Table 2.

Table 2. Respondents shown by age

Age Categories	Frequency	%
Under 35	289	19.1%
35 to 44	284	18.8
45 to 54	338	22.4
55 to 64	367	24.3
65 or more	233	15.4
Total	1511[a]	100.0%

[a]Missing cases were deleted.

The highest percentage of respondents were fifty-five to sixty-four years of age, followed by those forty-five to fifty-four (22.4%). Distributed relatively evenly were those respondents under 35 (19.1%) and thirty-five to forty-four (18.8%) years of age, followed by those sixty-five and older (15.4%).

Education

Education was classified into categories according to the pattern of America's educational system. The results presented in Table 3 summarizes the education of the respondents.

Table 3. Respondents shown by education

Education	Frequency	%
1-8 years	165	10.8%
9-11 years	82	5.4
12 years	781	50.5
13-15 years	310	20.1
16 or more	162	10.5
Total	1451[a]	100.0%

[a]Missing cases were deleted.

The educational data shows that half of the respondents (50.5%) attended 12 years of school followed by 13-15 years (20.1%), 16 or more (10.5%), 1-8 years (10.8%), and 9-11 years (5.4%).

Income

Table 4 represents the income level of the respondents. The income data of the 1982 study indicates that the highest percentage of respondents (30.2%) had gross farm incomes of $40,000 to 99,999. The income groups under $199,999 (excluding $40,000 tp 99,999) have a relatively even distribution. They are followed by $200,000 or more (10.5%).

Table 4. Respondents shown by income

Income	Frequency	%
Under $20,000	276	19.0%
$20,000 to 39,999	273	18.8
$40,000 to 99,999	438	30.2
$100,000 to 199,999	302	19.5
$200,000 or more	162	10.5
Total	1531[a]	100.0%

[a]Missing cases were deleted.

Off-farm Employment

The frequency distribution for off-farm employment (see Table 5) that 27.3% of the farmers indicated they worked off the farm, while 72.2% did not.

Table 5. Frequency distribution: Off-farm employment

During last year, were you employed off the farm?	Frequency	%
No	1034	72.7%
Yes	389	27.3
Total	1423[a]	100.0%

[a]Missing cases were deleted.

New Technology Adoption

To determine farmers' adoption of new technology, they were asked to indicate ownership of a microcomputer. Table 6 shows that only 15.2% of the farmers said they have a microcomputer, while 84.8% said they did not.

Table 6. Frequency distribution: New technology adoption

Do you have a microcomputer?	Frequency	%
No	556	84.8%
Yes	100	15.2
Total	656[a]	100.0%

[a]Missing cases were deleted.

Information Source Use

Mass media use and interpersonal source use were measured in order to identify the information sources that are utilized most often by Iowa farmers. The intent is to determine those information sources farmers use to gather information for a agricultural purposes.

The combined frequency distribution for mass media use and interpersonal sources use for 1982, 1984 and 1989 are presented in Tables 7 and 8. Table 7 shows the distribution of the mass media used by farmers to obtain agricultural information.

Table 7. Mass media sources and usage

Source	Frequency	%
MASS MEDIA		
General Farm Magazines		
Never	20	1.4%
Sometimes	411	28.3
Often	600	45.3
Very Often	422	29.0
Total	1453[a]	100.0%
Specialized Farm Magazines		
Never	274	18.9
Sometimes	676	46.5
Often	367	25.3
Very Often	136	8.8
Total	1453[a]	100.0%
Dealer Publication		
Never	310	21.3
Sometimes	815	56.1
Often	248	17.1
Very Often	80	5.5
Total	1453[a]	100.0%
Farm Organization Publication		
Never	339	23.3
Sometimes	643	44.3
Often	316	21.7
Very Often	155	10.7
Total	1453[a]	100.0%

[a]Missing cases were deleted.

Table 7: (continued)

Sources	Frequency	%
Extension Bulletins		
Never	166	11.4%
Sometimes	740	50.9
Often	427	29.4
Very Often	120	8.3
Total	1453[a]	100.0%
Private Newsletters		
Never	722	49.7
Sometimes	432	29.7
Often	172	11.8
Very Often	127	8.7
Total	1453[a]	100.0%
TV Farm Programs		
Never	248	17.1
Sometimes	816	56.2
Often	295	20.3
Very Often	94	6.5
Total	1453[a]	100.0%
Radio Farm Programs		
Never	200	13.8%
Sometimes	690	47.5
Often	410	28.2
Very Often	153	10.5
Total	1453[a]	100.0%

Table 7: (continued)

Sources	Frequency	%
Newspapers		
Never	88	6.1
Sometimes	670	46.1
Often	508	35.0
Very Often	187	12.9
Total	1453[a]	100.0
Computer-Based Information Systems		
Never	687	86.3
Sometimes	81	10.2
Often	21	2.6
Very Often	7	.9
Total	796[a]	100.0%

The mass medium used by farmers most frequently is general farm magazines (29.0%). This is to be expected for the reason that respondents for the surveys were taken from a list of subscribers to Wallace's Farmer which is a general farm magazine. It would be safe to predict that general farm magazines would be the information source most often used among the farmers. Newspapers (12.9%) followed general magazines as the second most often used medium. Farm organization publications (10.7%) and radio (10.5%) followed newspapers.

Table 8. Interpersonal sources and usage

Sources	Frequency	%
INTERPERSONAL SOURCES		
Farmers in County		
Almost Never	44	3.0%
1 to 2 Times	243	16.7
3 to 6 Times	421	28.9
7 to 14 Times	362	24.9
15 or More	386	26.5
Total	1456[a]	100.0%
Farmers outside County		
Almost Never	310	21.3
1 to 2 Times	647	44.4
3 to 6 Times	353	24.2
7 to 14 Times	99	6.4
15 or More	47	3.0
Total	1456[a]	100.0%
County Extension People		
Almost Never	799	54.9
1 to 2 Times	552	37.9
3 to 6 Times	90	6.2
7 to 14 Times	11	.8
15 or More	4	.3
Total	1456[a]	100.0%

[a]Missing cases were deleted.

Table 8: (continued)

Sources	Frequency	%
Extension People outside County		
Almost Never	1295	88.9
1 to 2 Times	143	9.8
3 to 6 Times	14	1.0
7 to 14 Times	4	.3
15 or More	---	---
Total	1456[a]	100.0%
Equipment Dealers		
Almost Never	111	7.6
1 to 2 Times	485	33.3
3 to 6 Times	510	35.0
7 to 14 Times	232	15.9
15 or More	118	8.1
Total	1456[a]	100.0%
Professionals		
Almost Never	368	25.3
1 to 2 Times	575	29.5
3 to 6 Times	396	27.2
7 to 14 Times	72	4.9
15 or More	45	3.1
Total	1456[a]	100.0%

Table 8 presents the frequency distribution for interpersonal source use among Iowa farmers. The most frequently used interpersonal source for each year was farmers in the county (26.5%), followed by equipment dealers (8.1%), farmers outside the county

(3.0%) and professionals (3.1%). These results seem to indicate that farmers use print media and personal sources most often to obtain agricultural information.

Section II. Testing of Hypotheses

This section deals with the testing of hypotheses using mean analyses, chi-square and regression. Means tests were used to determine the relationship between age, education, income and the use of mass media and interpersonal sources. Age, education and income were used as independent variables. Media use was divided into two levels --- High use for "often" and "very often," and low use for "never" and "sometimes".

The chi-square analysis was used to determine the relationship between off-farm employment, new technology adoption and the use of mass media and interpersonal sources. Off-farm employment and new technology adoption were used as independent variables.

The final analysis, regression, was used to determine the relationship between age, education, income, off-farm employment, new technology adoption, general mass media sources, general interpersonal sources, specialized mass media sources and specialized interpersonal sources. Age, education, income, off-farm employment, and new technology adoption were used as independent variables.

General Hypothesis I: There is a negative relationship between age and mass media use; however, there is a positive relationship between age and newspaper use.

The analysis of age and the use of mass media sources (see Table 9) indicated a significant negative relationship between age and the use of general farm magazines, specialized farm magazines and private newsletters. The results seem to indicate that younger farmers are using these information sources more than older farmers to obtain agricultural information.

These results could possibly be explained by the farmers' level of education. Younger farmers tend to be more educated than older farmers. Trends show that the younger farmers are seeking higher levels of education, meaning that they have higher levels of reading and comprehension abilities; therefore, they are a targeted audience for specialized sources.

Another factor that may explain these results is farmer retirement. Those farmers who are close to retiring may have changed their information seeking habits. They are no longer interested in the information that is provided for them.

The analysis also indicated a positive significant relationship between age and the use of television and newspapers. The older farmers are using these sources more than the younger farmers. Again, the theory of older farmers' loss of interest in

seeking information could be applied here. Older farmers depend on newspapers and television to provide them with the information they are seeking. They may be familiar with the different information sources that are available to them; however, they may feel that many of the more specialized sources no longer provide them with the information they are seeking.

These results can also be explained by older farmers spending more time at home than younger farmers. They have more time to watch television and read the newspapers. Recent research predicted that the trend for newspaper readership would be different. Because the younger generation is attaining higher levels of education, researchers originally predicted that those who are younger would read the newspapers more often; however, they are not.

As expected, there were mixed results between age and mass media use, but this does not apply to all the mass media sources. There was no significant relationship between age and the use of dealer magazines, farm organization publications, university Extension bulletins, radio and computer services. There was no significant age difference between the farmers who used these sources.

As expected, there was a positive relationship between age and newspaper use. However, there was also a positive relationship between age and television use that was not predicted.

Table 9. Mean analysis of farmers'age and mass media use

Independent Variable	Dependent Variable	Mean Age High Use	Mean Age Low Use	Sig.
Farmers' Age	Use of general farm magazines	49.2	51.2	.0103
Farmers' Age	Use of specialized farm magazines	47.3	51.1	.0000
Farmers' Age	Use of dealer magazines	50.5	49.6	.2720
Farmers' Age	Use of farm organi-zation publications	50.2	49.6	.4336
Farmers' Age	Use of university Extension bulletins	50.5	49.4	.1440
Farmers' Age	Use of private newsletters	47.4	50.4	.0007
Farmers' Age	Use of television	52.1	48.9	.0001
Farmers' Age	Use of Radio	50.2	49.5	.3475
Farmers' Age	Use of Newspapers	51.6	48.1	.0000
Farmers' Age	Use of computer services	45.1	48.9	.1337

General Hypothesis II: There is a positive relationship between age and interpersonal source use.

The analysis of age and the use of interpersonal sources (see Table 10) indicate a positive relationship between age and using county Extension people as a source of information. The results

seem to indicate that older farmers use this source more often than younger farmers to obtain agricultural information.

The results could possibly be explained by the number of years older farmers have been living in the community. They may have established a long term relationship with the Extension people; therefore, this source is readily available to them.

Even though the results indicate a positive relationship with one of the sources, the analysis did not produce the expected results. The results show that there is a significant negative relationship between age and the use of other farmers in the county, farmers outside the county, equipment dealers and professionals as sources of information.

These results seem to indicate that younger farmers use these sources more often than older farmers to obtain agricultural information. It was predicted that older farmers would use these sources more; therefore, the results are not as expected.

As mentioned earlier, younger farmers tend to be more educated and have a higher income than older farmers. They are interested in any information that would improve their agricultural situations. Younger farmers tend to adopt new technologies; therefore, they may obtain information from personal sources who have experienced the technology they are interested in and can also provide feedback that will aid making a decision. Talking to other farmers can provide hands on experiences, while talking to Extension people, equipment dealers and professionals can provide a more technical outlook.

The results also indicate that there was no significant relationship between age and the use of Extension people outside the county. This may be because there are not many people using this source.

Table 10. Mean analysis of farmers' age and interpersonal source use

Independent Variable	Dependent Variable	Mean Age High Use	Mean Age Low Use	Sig.
Farmers' Age	Use of farmers in the county	45.9	51.2	.0000
Farmers' Age	Use of farmers outside county	44.8	49.9	.0134
Farmers' Age	Use of Extension personnel in county	52.7	49.6	.0259
Farmers' Age	Use of Extension personnel outside county	50.0	49.8	.8047
Farmers' Age	Use of farm equipment dealers	44.3	50.2	.0000
Farmers' Age	Use of professionals	45.3	49.9	.0292

General Hypothesis III: There is a positive relationship between education and mass media use.

The analysis of education and the use of mass media sources indicated (see Table 11) a significant positive relationship

between education and the use of general farm magazines, specialized farm magazines, newspapers, and computer services. These results indicate that the farmers who are more educated are using these sources to obtain agricultural information.

These results could be explained by the theory that those individuals who are more educated tend to read information that is more specialized. Those farmers who are more educated seem to read more than those who are less educated. Farmers who are less educated tend to be older and they are no longer concerned with specific agricultural information. They may also find it difficult to compete with those farmers who are better educated.

Farmers who are better educated tend to be younger and are trying to survive in a modern world of agriculture, unlike older farmers. Modern agriculture demands competence in the areas of science and management. Farmers find that farming is a very complicated and competitive occupation; therefore, higher levels of education are needed in order to survive.

As expected, there is a positive relationship between education and mass media use, but not all mass media. There was a negative relationship between education and the use of university Extension bulletins. The results show that farmers with higher levels of education used the bulletins less often as an informations source. Those farmers with less education were using the bulletins.

Extension bulletins are available for everyone. They are directed toward the uneducated and educated alike. Those who are less educated may depend on the bulletins because they provide them with new and essential information that can be of further benefit through personal communication (telephone calls, personal visits, etc.).

The results also show that there was no significant relationship between education and the use of dealer magazines, farm organization publications, television and radio.

General Hypothesis IV: There is a positive relationship between education and interpersonal source use.

The analysis of education and the use of interpersonal sources (see Table 12) indicate a significant positive relationship between education and the use of farmers as information sources in the county. The results indicate that the more educated farmers are using this source more often to obtain agricultural information.

These farmers may be using these sources to obtain personal information that will help them to learn more about new agricultural innovations and in making decision about whether to adopt those innovations. As a farmer becomes more educated, his attitude toward the importance of information changes.

There were not enough significant relationships to support this hypothesis. There was no significant relationship between farmers' education and the use of farmers outside the county, county Extension people, Extension people outside the county, farm equipment dealers and professionals.

Table 11. Mean analysis of farmers' education and mass media use

Independent Variable	Dependent Variable	Education Score[a] High Use	Low Use	Sig.
Farmers' Education	Use of general farm magazines	3.29	2.95	.0000
Farmers' Education	Use of specialized farm magazines	3.36	3.09	.0000
Farmers' Education	Use of dealer magazines	3.12	3.20	.2283
Farmers' Education	Use of farm organization publications	3.21	3.18	.6004
Farmers' Education	Use of university Extension bulletins	3.07	3.38	.0000
Farmers' Education	Use of private newsletters	3.58	3.08	.0000
Farmers' Education	Use of television	3.17	3.19	.7598
Farmers' Education	Use of Radio	3.24	3.15	.1093
Farmers' Education	Use of Newspapers	3.24	3.13	.0474
Farmers' Education	Use of computer services	3.67	3.14	.0104

[a] 1 = 1-8 years (Elementary School), 2 = 9-11 years (Attended some High School), 3 = 12 years (Graduated High School), 4 = 13-15 years (Attended College), 5 = 16 or more years (Graduated College).

Table 12. Mean analysis of farmers' education and interpersonal source use

Independent Variable	Dependent Variable	Education Score[a] High Use	Low Use	Sig.
Farmers' Education	Use of farmers in the county	3.32	3.14	.0040
Farmers' Education	Use of farmers outside county	3.26	3.18	.6594
Farmers' Education	Use of Extension personnel in county	3.30	3.18	.2552
Farmers' Education	Use of Extension personnel outside	3.34	3.17	.0558
Farmers' Education	Use of farm equipment dealers	3.35	3.17	.0966
Farmers' Education	Use of professionals	3.22	3.19	.8486

[a] 1 = 1-8 years (Elementary School), 2 = 9-11 years (Attended some High School), 3 = 12 years (Graduated High School), 4 = 13-15 years (Attended College), 5 = 16 or more years (Graduated College).

General Hypothesis V: There is a positive relationship between income and mass media use.

The analysis of income and the use of mass media sources (see Table 13) indicated a significant positive relationship between income and the use of general farm magazines, specialized farm magazines, dealer magazines, university Extension bulletins, private newsletters, radio and computer services. These results

indicate that the farmers with higher levels of income are using these sources more often to obtain agricultural information.

Those farmers with higher levels of income have the means that are necessary to obtain communication sources that provide them with the information concerning the development of new communication technologies and agricultural innovations. Farmers with low income are not aware of the technologies that are available to them, or they are aware of these new technologies, but they cannot afford them.

High income farmers are aware of new advances that occur in the agricultural community. They depend on the different types of information sources to provide them with information. They do not only need the income, but also the education and personal contacts that are necessary to keep them updated.

As expected, there was a positive relationship between income and mass media use, except for farm organiation publications, newspapers and television. The results show that there was no significant income difference among the farmers who used these sources.

General Hypothesis VI: There is a positive relationship between income and interpersonal source use.

The analysis of income and the use of interpersonal sources (see Table 14) indicated a significant positive relationship between income and the use of other farmers, Extension people

Table 13. Mean analysis of farmers' income and mass media use

Independent Variable	Dependent Variable	Income Score[a] High Use	Low Use	Sig.
Farmers' Income	Use of general farm magazines	2.93	2.71	.0038
Farmers' Income	Use of specialized farm magazines	3.21	2.68	.0000
Farmers' Income	Use of dealer magazines	3.11	2.79	.0001
Farmers' Income	Use of farm organization publications	2.92	2.83	.2485
Farmers' Income	Use of university Extension bulletins	3.08	2.73	.0000
Farmers' Income	Use of private newsletters	3.43	2.71	.0000
Farmers' Income	Use of television	2.87	2.86	.9349
Farmers' Income	Use of Radio	3.02	2.76	.0002
Farmers' Income	Use of Newspapers	2.93	2.80	.0698
Farmers' Income	Use of computer services	4.00	2.71	.0000

[a]1 = Under $20,000, 2 = $20,000 to 39,999, 3 = $40,000 to 99,999, 4 = $100,000 to 199,999, 5 = 200,000 or more.

outside the county and equipment dealers. The results indicate that farmers with higher income use these sources more often to obtain agricultural information.

Farmers who have a higher level of income tend to have more acres of farmland. They must be aware of recent developments and

changes that occur in the agricultural community. They rely on different sources to provide them with information, because the lack of information can result in income loss.

Table 14. Mean analysis of farmers' income and interpersonal source use

Independent Variable	Dependent Variable	Income Score[a] High Use	Low Use	Sig.
Farmers' Inocme	Use of farmers in the county	3.18	2.75	.0000
Farmers' Income	Use of farmers outside county	2.97	2.86	.5555
Farmers' Income	Use of Extension personnel in county	2.95	2.86	.4943
Farmers' Income	Use of Extension personnel outside county	3.10	2.83	.0132
Farmers' Income	Use of farm equipment dealers	3.36	2.82	.0000
Farmers' Income	Use of professionals	3.23	2.85	.0533

[a]1 = Under $20,000, 2 = $20,000 to 39,999, 3 = $40,000 to 99,999, 4 = $100,000 to 199,999, 5 = 200,000 or more.

As expected, there is a positive relationship between farmers' income and the use of some interpersonal sources. However, results for the other sources do not support the hypothesis. There was no significant relationship shown between a farmer's income and the use of farmers outside the county, county Extension people or for professionals.

General Hypothesis VII: There is a negative relationship between off-farm employment and mass media use.

The chi-square test was used to determine whether there is a relationship between off-farm employment and the use of mass media sources. The results indicate that the only significant relationship is between off-farm employment and the use of general farm magazines (see Table 15).

Crosstabulation of off-farm employment by general farm magazines showed that significantly more farmers who said they were employed off the farm said they used general farm magazines for agricultural information than did those who do not work off the farm.

These results seem to indicate that most of the farmers who are employed off the farm continue to use general farm magazines as sources of information. This does not support the expected results. It was expected that farmers who were employed off the farm would use these sources less often to obtain agricultural information, since they were now spending less time at home.

The chi-square tests used to determine the relationship between off-farm employment and the use of specialized farm magazines, dealer magazines, farm organization publications, university Extension bulletins, private newsletters, television, radio, newspapers and computer services to obtain agricultural information indicated that there is no significant relationship between

these variables. Off-farm employment does not have a significant effect on farmers' use of these sources; therefore, the results are not presented and the hypothesis was not supported.

Table 15. Use of general farm magazines by off-farm employment

Crosstabulation: GENFARM USE GENERAL FARM MAGAZINES By OFFARM EMPLOYMENT OFF FARM

Count / Col Pct	OFFARM-> No (0)	Yes (1)	Row Total
GENFARM 0 Never	17 / 1.7	3 / .8	20 / 1.4
1 Sometimes	310 / 30.2	87 / 22.6	397 / 28.1
2 Often	428 / 41.6	159 / 41.3	587 / 41.5
3 Very Often	273 / 26.6	136 / 35.3	409 / 28.9
Column Total	1028 / 72.8	385 / 27.2	1413 / 100.0

Chi-Square	D.F.	Significance
14.65574	3	.0021

Number of Missing Observations = 133

General Hypothesis VIII: There is a positive relationship between new technology adoption and mass media use.

The chi-square test was used to determine whether there is a relationship between new technology adoption and mass media use. The results indicate that there are significant positive relationships between new technology adoption and the use of specialized farm magazines, extension bulletins, private newsletters and com puter services to obtain agricultural information (see Tables 16, 17, 18, and 19).

The crosstabulation results seem to indicate that farmers who adopt a new technology such as computers use more media sources to obtain agricultural information.

For more general media sources, such as the use of general farm magazines, farm dealers publications, farm organization publications, television, radio and newspapers there was no significant relationship between adoption of a new technology and use of these sources.

Table 16. Use of specialized farm magazines by adoption of new technology

Crosstabulation: SPECMAG USE SPECIALIZED FARM MAGAZINES
By CASS NEW TECHNOLOGY ADOPTION

CASS->	Count / Col Pct	No .00	Yes 1.00	Row Total
SPECMAG				
0 Never		264 / 20.0	10 / 7.6	274 / 18.9
1 Sometimes		619 / 46.9	57 / 43.2	676 / 46.5
2 Often		323 / 24.5	44 / 33.3	367 / 25.3
3 Very Often		115 / 8.7	21 / 15.9	136 / 9.4
	Column Total	1321 / 90.9	132 / 9.1	1453 / 100.0

Chi-Square	D.F.	Significance
20.54990	3	.0001

Number of Missing Observations = 93

Table 17. Use of extension bulletins by adoption of new technology

Crosstabulation: EXTBULL USE EXTENSION BULLETINS
By CASS NEW TECHNOLOGY ADOPTION

CASS->	Count / Col Pct	No .00	Yes 1.00	Total
EXTBULL				
0 Never		158 / 12.0	8 / 6.1	166 / 11.4
1 Sometimes		684 / 51.8	56 / 42.4	740 / 50.9
2 Often		375 / 28.4	52 / 39.4	427 / 29.4
3 Very Often		104 / 7.9	16 / 12.1	120 / 8.3
	Column Total	1321 / 90.9	132 / 9.1	1453 / 100.0

Chi-Square	D.F.	Significance
13.28828	3	.0041

Number of Missing Observations = 93

Table 18. Use of private newsletters by adoption of new technology

Crosstabulation: PRIVINFO USE PRIVATE NEWSLETTERS
By CASS NEW TECHNOLOGY ADOPTION

CASS->	Count / Col Pct	No .00	Yes 1.00	Row Total
PRIVINFO				
0 Never		678 / 51.3	44 / 33.3	722 / 49.7
1 Sometimes		387 / 29.3	45 / 34.1	432 / 29.7
2 Often		147 / 11.1	25 / 18.9	172 / 11.8
3 Very Often		109 / 8.3	18 / 13.6	127 / 8.7
	Column Total	1321 / 90.9	132 / 9.1	1453 / 100.0

Chi-Square	D.F.	Significance
18.91314	3	.0003

Number of Missing Observations = 93

Table 19. Use of computer services by adoption of new technology

Crosstabulation: CINFOSYS USE COMPUTER SERVICES By CASS NEW TECHNOLOGY ADOPTION

CASS->	Count / Col Pct	No .00	Yes 1.00	Row Total
CINFOSYS				
0 Never	0	667	20	687
		87.3	62.5	86.3
1 Sometimes	1	77	4	81
		10.1	12.5	10.2
2 Often	2	16	5	21
		2.1	15.6	2.6
3 Very Often	3	4	3	7
		.5	9.4	.9
	Column Total	764	32	796
		96.0	4.0	100.0

Chi-Square	D.F.	Significance
51.04410	3	.0000

Number of Missing Observations = 750

General Hypothesis IX: There is a negative relationship between off-farm employment and interpersonal source use.

The chi-square test was used to determine the relationship between off-farm employment and the use of interpersonal sources. The results indicate that the significant relationships were between off-farm employment and the use of equipment dealers and professionals (see Tables 20 and 21).

Crosstabulation of off-farm employment by use of equipment dealers showed that the results are significant but mixed. More off-farm employed farmers said they "never" talk to equipment dealers (9.5% to 7%), but more off-farm employed farmers also said they had 15 or more contacts per year (10.1% to 7.4%).

Crosstabulation of off-farm employment by use of professionals showed that off-farm employed farmers are less likely to have contact with professionals.

These results can be explained by the farmers' work schedule. Being employed off the farm does not allow the farmer with enough time that is necessary to consult a professional. Farmers who are employed off the farm may be obtaining their information from other sources. Because farmers are spending more time on the job, coworkers may be replacing other sources as major sources of information.

Chi-square tests used to determine the relationship between off-farm employment and talking to other farmers, farmers outside the county, county Extension people, and Extension people outside the county as sources of information indicated that there is no significant relationship between these variables.

Table 20. Talking to equipment dealers by off-farm employment

Crosstabulation: TALKDLR TALK TO EQUIPMENT DEALERS
By OFFARM EMPLOYMENT OFF FARM

OFFARM-> / TALKDLR	Count / Col Pct	No 0	Yes 1	Row Total
0 Almost Never		72 / 7.0	37 / 9.5	109 / 7.7
1 1-2 Times		337 / 32.8	134 / 34.5	471 / 33.3
2 3-6 Times		361 / 35.2	136 / 35.1	497 / 35.1
3 7-14 Times		181 / 17.6	42 / 10.8	223 / 15.8
4 15 or More		76 / 7.4	39 / 10.1	115 / 8.1
Column Total		1027 / 72.6	388 / 27.4	1415 / 100.0

Chi-Square	D.F.	Significance
13.28004	4	.0100

Number of Missing Observations = 131

Table 21. Talking with professionals by off-farm employment

Crosstabulation: TALKPRO TALK TO PROFESSIONALS
By OFFARM EMPLOYMENT OFF FARM

OFFARM-> / TALKPRO	Count / Col Pct	No 0	Yes 1	Row Total
0 Almost Never		242 23.6	114 29.4	356 25.2
1 1-2 Times		401 39.0	162 41.8	563 39.8
2 3-6 Times		301 29.3	84 21.6	385 27.2
3 7-14 Times		49 4.8	19 4.9	68 4.8
4 15 or More		34 3.3	9 2.3	43 3.0
	Column Total	1027 72.6	388 27.4	1415 100.0

Chi-Square	D.F.	Significance
11.29795	4	.0234

Number of Missing Observations = 131

General Hypothesis X: There is a negative relationship between new technology adoption and interpersonal source use.

The chi-square test was used to determine whether there is a relationship between new technology adoption and the use of inter-

personal sources. The results indicate that significant positive relationships exist between new technology adoption and talking to farmers outside the county, Extension people outside the county and professionals to obtain agricultural information (see Tables 22, 23 and 24).

Crosstabulation of new technology adoption by farmers outside the county showed that farmers who adopted the new technology were likely to talk to farmers outside the county more.

Crosstabulation of new technology adoption by talking to Extension people outside the county showed that farmers who adopted the new technology were more likely to talk to Extension people.

Crosstabulation of new technology adoption by professionals showed that farmers who adopted a new technology were more likely to talk to professionals.

Chi-square tests showed that there was no significant relationship between a farmers' adoption of new technology and talking to other farmers, talking to Extension people in the county and farm equipment dealers. New technology adoption does not have a significant effect on farmers' use of these sources; therefore, the results are not presented.

Table 22. Talking with farmers outside the county by new technology adoption

Crosstabulation: TLKOUTCO TALK TO FARMERS OUTSIDE COUNTY
By CASS NEW TECHNOLOGY ADOPTION

CASS-> Count / Col Pct	No .00	Yes 1.00	Row Total
TLKOUTCO 0 Almost Never	296 / 22.3	14 / 10.7	310 / 21.3
1 1-2 Times	582 / 43.9	65 / 49.6	647 / 44.4
2 3-6 Times	316 / 23.8	37 / 28.2	353 / 24.2
3 7-14 Times	88 / 6.6	11 / 8.4	99 / 6.8
4 15 or More	43 / 3.2	4 / 3.1	47 / 3.2
Column Total	1325 / 91.0	131 / 9.0	1456 / 100.0

Chi-Square	D.F.	Significance
9.97626	4	.0408

Number of Missing Observations = 90

Table 23. Talking with extension people outside county by new technology adoption

Crosstabulation: OUTCOEXT TALK TO EXTENSION PEOPLE OUTSIDE COUNTY
By CASS NEW TECHNOLOGY ADOPTION

CASS-> Count / Col Pct	No .00	Yes 1.00	Row Total
OUTCOEXT			
0 Almost Never	1189 / 89.7	106 / 80.9	1295 / 88.9
1 1-2 Times	121 / 9.1	22 / 16.8	143 / 9.8
2 3-6 Times	12 / .9	2 / 1.5	14 / 1.0
3 7-14 Times	3 / .2	1 / .8	4 / .3
Column Total	1325 / 91.0	131 / 9.0	1456 / 100.0

Chi-Square	D.F.	Significance
9.89743	3	.0195

Number of Missing Observations = 90

Table 24. Talking with professionals by new technology adoption

Crosstabulation: TALKPRO TALK TO PROFESSIONALS
By CASS NEW TECHNOLOGY ADOPTION

CASS->	Count / Col Pct	No .00	Yes 1.00	Row Total
TALKPRO				
0 Almost Never	0	343	25	368
		25.9	19.1	25.3
1 1-2 Times	1	524	51	575
		39.5	38.9	39.5
2 3-6 Times	2	362	34	396
		27.3	26.0	27.2
3 7-14 Times	3	58	14	72
		4.4	10.7	4.9
4 15 or More	4	38	7	45
		2.9	5.3	3.1
	Column Total	1325	131	1456
		91.0	9.0	100.0

Chi-Square	D.F.	Significance
14.23774	4	.0066

Number of Missing Observations = 90

Section III. Mutliple Regression Analyses

In this section, multiple regression analyses were used to test the predictive powers of age, education, income, off-farm employment and new technology adoption in the use of general mass media sources, general interpersonal sources, specialized mass media sources and specialized interpersonal sources. Because off-farm employment and new technology adoption are dichotomous variables, each variable will be analyzed individually along with the demographic variables.

Many studies have found that demographic variables are strong predictors of information source use. For this study, it was proposed that income will be the best predictor of specialized information source use, followed by age and education. Off-farm employment and new technology adoption will be the weakest predictors.

The regression shows that there is a significant relationship between off-farm employment, age, education, income and general mass media use. These results indicate that farmers who are older, better educated, have high income and employed off the farm use these sources more often to obtain agricultural information.

Table 25 presents income as the best predictor of the use of these sources, followed by off-farm employment, age and education.

Table 25. Multiple regression analysis of off-farm employment, age, education, income and general mass media use

Independent Variable	Dependent Variable	R^2	Sig.	Standardized Beta Weight
Income	Use of general mass media	.016	.0000	.161
Off-farm Employment	Use of general mass media	.023	.0036	.085
Age	Use of general mass media	.028	.0003	.111
Education	Use of general mass media	.035	.0015	.095

Table 26. Multiple regression analysis of new technology adoption, age, education, income and general mass media use

Independent Variable	Dependent Variable	R^2	Sig.	Standardized Beta Weight
Income	Use of general mass media	.016	.0000	.134
Education	Use of general mass media	.021	.0002	.108
Age	Use of general mass media	.029	.0013	.095
New Technology Adoption	Use of general mass media	----	.9261	----

The cumulative R^2 shows that the effect of farmers' age,

education and income on general mass media use indicates a weak predictive relationship.

Table 26, includes the variable of adoption of a new technology. New technology was not a significant predictor of the use of this source.

Table 27. Multiple regression analysis of off-farm employment, age, education, income and general interpersonal source use

Independent Variable	Dependent Variable	R^2	Sig.	Standardized Beta Weight
Age	Use of general interpersonal sources	.078	.0000	-.236
Income	Use of general interpersonal sources	.128	.0000	.227
Education	Use of general interpersonal sources	----	.3698	----
Off-farm Employment	Use of general interpersonal sources	----	.4022	----

For interpersonal source use, the regression (Table 27) shows that age and income are significant predictors. The negative relationship of age indicates that younger farmers are using the sources more often than older farmers to obtain agricultural information. Older farmers are not spending much time talking to other farmers; therefore, they are not seeking out information. The results also indicate that farmers with high income actively seek out this information source, while those farmers with less income are less active in seeking out this source.

Table 27 presents age and income as the best predictors of general interpersonal source use. Education and off-farm employment are not significant predictors.

Table 28. Multiple regression analysis of new technology adoption, age, education, income, and general interpersonal source use

Independent Variable	Dependent Variable	R^2	Sig.	Standardized Beta Weight
Age	Use of general interpersonal sources	.079	.0000	-.235
Income	Use of general interpersonal sources	.128	.0000	.227
Education	Use of general interpersonal sources	----	.3201	----
New Technology Adoption	Use of general interpersonal sources	----	.9566	----

Table 28 shows that new technology adoption is not a significant predictor of general interpersonal source use.

Table 29 shows how new technology adoption, age, education and income predict specialized mass media use. Results show that high income, education and new technology adoption predict specialized media use. Specialized media look for those farmers with certain characteristics, higher education and income levels. A farmer with an income more that $100,000 is sure to have access to all types of magazines. Those farmers who are better educated tend to use sources that are directed toward specific information.

Table 29. Multiple regression analysis of new technology adoption, age, education, income and specialized mass media use

Independent Variable	Dependent Variable	R^2	Sig.	Standardized Beta Weight
Income	Use of specialized mass media	.090	.0000	.268
Education	Use of specialized mass media	.136	.0000	.198
Age	Use of specialized mass media	----	.7262	----
New Technology Adoption	Use of specialized mass media	.141	.0069	.071

Farmers with less education may find sources of this type to be more of a challenge.

Table 30. Multiple regression analysis of off-farm employment, age, education, income and specialized mass media use

Independent Variable	Dependent Variable	R^2	Sig.	Standardized Beta Weight
Income	Use of specialized mass media	.092	.0000	.281
Age	Use of specialized mass media	----	.9322	----
Education	Use of specialized mass media	.137	.0000	.213
Off-farm Employment	Use of specialized mass media	----	.9073	----

Table 30 repeats the analysis for specialized media use, but substitutes off-farm employment for adoption of a new technology. Results show that off-farm employment is not a significant predictor of specialized media use.

Table 31. Multiple regression analysis of new technology adoption, age, education, income and specialized interpersonal source use

Independent Variable	Dependent Variable	R^2	Sig.	Standardized Beta Weight
Income	Use of specialized interpersonal sources	.066	.0000	.223
Education	Use of specialized interpersonal sources	.090	.0000	.118
New Technology Adoption	Use of specialized interpersonal sources	.094	.0225	.062
Age	Use of specialized interpersonal sources	.097	.0320	-.061

Table 31 shows the regression of adoption of new technology, age, income and education on specialized interpersonal source use. Results show that all four variables are significantly related to use of specialized interpersonal sources.

These results seem to indicate that farmers with high income and who are better educated use these sources more often than those farmers with less education and income. It also shows that those farmers who adopted new technology tend to use these sources more often than farmers who did not adopt new technology.

Age and the use of specialized interpersonal sources indicated a negative trend. The negative relationship may indicate that younger farmers tend to use these sources more often that older farmers to obtain agricultural information. Younger farmers tend to be more educated and have higher income than older farmers; therefore, younger farmers seem to be interested in sources that can provide them with specific types of information.

Table 32 shows that off-farm employment is not a significant predictor of specialized interpersonal source use.

Table 32. Multiple regression analysis of off-farm employment, age, education, income and specialized interpersonal source use

Independent Variable	Dependent Variable	R^2	Sig.	Standardized Beta Weight
Income	Use of specialized interpersonal sources	.068	.0000	.235
Education	Use of specialized interpersonal sources	.093	.0000	.130
Age	Use of specialized interpersonal sources	.097	.0169	-.069
Off-farm Employment	Use of specialized interpersonal sources	----	.2843	----

CHAPTER V. SUMMARY AND DISCUSSION

This thesis examined the relationship between age, education, income, off-farm employment, new technology adoption, and use of mass media and interpersonal sources by Iowa farmers. The purpose of the research was to determine those information sources farmers use to obtain agricultural information and to determine the effect age, education, income, off-farm employment, and new technology adoption has on farmers' use of these sources.

Data for this thesis were obtained in 1982, 1984 and 1989. The three data bases were combined to form a sample of 1546 farmers living in Iowa. The questionnaire was mailed to the respondents who were responsible for answering and returning the questionnaire.

From the study important observations emerged. Earlier studies found that age was negatively related to information source use. However, recent research indicated that positive relationships may exist between age and the use of mass media information sources.

Findings showed that age was positively related to the use of newspapers. This prediction matches Bogart's 1989 study of age and general audiences. Younger farmers seem to be using the specialized sources to obtain information, while older farmers seem to be utilizing general sources.

Education was positively related to less than half of the information variables, while there was no significant relationship between the others. There was an unexpected negative relationship between education and the use of university Extension bulletins which seems to indicate that this source is being used more often by farmers who are older and less educated and that these farmers are attempting to seek out sources that can provide them with information.

Income appeared to be more significantly related to the use of information sources than were education and age. Income also was strongest predictor variable of the demographic variables. This seems to indicate that if a farmers' income level is known, his use of information sources can be predicted.

Previous research suggested that off-farm employment and new technology adoption may also serve as variables that are able to indicate farmers' use of information sources. Studies predicted that off-farm employment would affect where farmers obtained their information because of the time spent on the job. In this study, there was no significant relationship between off-farm employment and the information variables, indicating that it has no significant value as an indicator of farmers' use of information sources in this study.

However, new technology adoption was significantly related to information use. The results indicate that if a farmer adopted a computer, he was more likely to use specialized sources to obtain agricultural information.

In an effort to determine which of the variables are better predictors of farmers' use of information sources, it was found that all of the variables were significant predictor variables; however, the R^2 were very weak, indicating that maybe there are other variables that are better predictors of information source use.

In this study, the demographic variables were better predictors with off-farm employment and new technology aiding in predicting the use of some of the sources. The latter variables are better predictors of specialized sources than general sources.

This study shows that there is a need to further investigate to determine other variables that may be more effective in predicting farmers' use of information sources to obtain agricultural information. The study also shows that there are some information sources that are not being used very often by farmers. The low income and less educated farmers seem to be those farmers who are not using these sources which are available to them.

Research suggests an investigation into why young farm operators are failing to use available communication channels and technology and what can be done to solve this problem. An investigation should be made to determine whether farmers are aware of the communication technology that can provide them with information that would aid in meeting the specialized needs and problems of the young farmer.

The study should also include an evaluation of young farmers' attitudes toward the information sources that can provide them with agricultural information. One of the major sources that should be included in that evaluation is the Extension Service. An analysis should be made of the Extension Service to determine whether educational programs are being utilized by young farmers. If young farmers are not using the services the following questions should be considered:

1. Does the problem lie with the farmer or the Extension Service.
2. Are Extension Services actively seeking out those farmers who are deprived of their services.
3. Are the farmers aware of the services.
4. What are the farmers' attitudes toward the Extension Service and the information sources available to them.

The development of an effective ways to reach young farmers should be considered by Extension Services.

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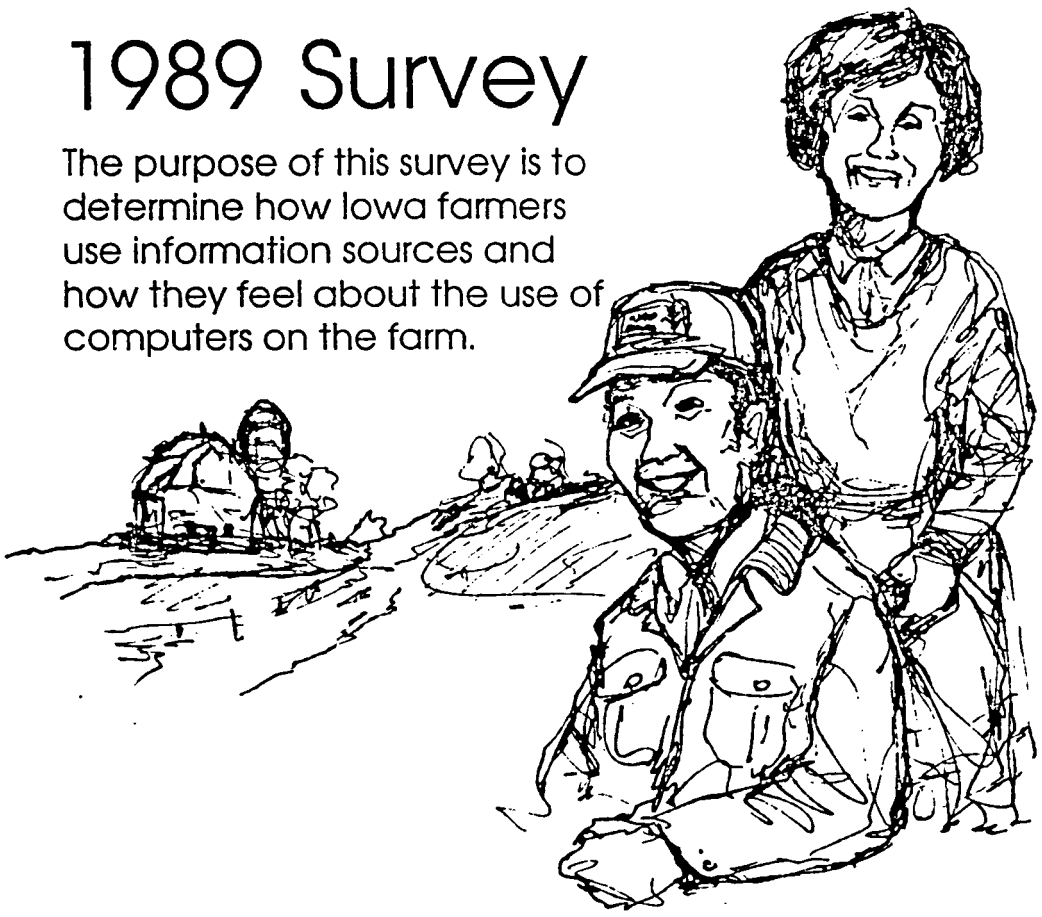
APPENDIX: SAMPLE OF 1989 SURVEY

Where Iowa Farmers Get Information 1989 Survey

The purpose of this survey is to determine how Iowa farmers use information sources and how they feel about the use of computers on the farm.



Agricultural and Home Economics Experiment Station Project 2725
in cooperation with
Iowa State University Cooperative Extension Service

Conducted by the
Department of Journalism and Mass Communication
Iowa State University, Ames, Iowa 50011

1

Do you currently own, operate or manage a farm? (Please circle your response)

1 NO If no, please stop now and return your questionnaire.
2 YES.....If yes, please complete the rest of the questionnaire.

1. We would like to know something about where you currently obtain information. Below is a list of sources which you may use for information about farming practices, management, weather and marketing. Please indicate how frequently you use each to obtain information which helps you do a better job of farming.

	How often do you use this source to obtain helpful information about farming? (Please circle your response)			
a. General farm magazines (such as Wallace's, Farm Journal, Successful Farming, etc.)	NEVER	SOMETIMES	OFTEN	VERY OFTEN
b. Specialized farm magazines (such as Feed Stuffs, Hog Farm Management, Crops and Soils, etc.)	NEVER	SOMETIMES	OFTEN	VERY OFTEN
c. Dealer's magazines (such as the Furrow, Ford Farming, Farm Profit, etc.)	NEVER	SOMETIMES	OFTEN	VERY OFTEN
d. Farm Organization publications (such as Farm Bureau Spokesman, NFO Reporter, Farmer's Union, etc.)	NEVER	SOMETIMES	OFTEN	VERY OFTEN
e. University Extension bulletins and/or newsletters	NEVER	SOMETIMES	OFTEN	VERY OFTEN
f. Private information and management newsletters (such as Doane's or Pro Farmer)	NEVER	SOMETIMES	OFTEN	VERY OFTEN
g. Television programs about farming	NEVER	SOMETIMES	OFTEN	VERY OFTEN
h. Radio programs about farming	NEVER	SOMETIMES	OFTEN	VERY OFTEN
i. Newspapers	NEVER	SOMETIMES	OFTEN	VERY OFTEN

2. During 1988, how many times did you attend a meeting, field day, or demonstration which was sponsored by each of the groups listed below?

a. Cooperative Extension	NONE	ONCE	2 OR 3 TIMES	4 TO 6 TIMES	7 OR MORE
b. Farm supply companies or cooperatives	NONE	ONCE	2 OR 3 TIMES	4 TO 6 TIMES	7 OR MORE
c. Other government agencies (ASCS, SCS, FmHA, etc.)	NONE	ONCE	2 OR 3 TIMES	4 TO 6 TIMES	7 OR MORE

2

In addition to using mass media, you probably talk to other people about farming. We'd like to know how often you do so.

3. In an average month, how many times do you talk by telephone or on a face-to-face basis about farming with each of the following types of people?

	Times a month talk about farming (Please circle one response)				
a. How often do you talk with other farmers who live in the county.....	ALMOST NEVER	1 OR 2 TIMES	3 TO 6 TIMES	7 TO 14 TIMES	15 OR MORE
b. Other farmers who live outside your county.....	ALMOST NEVER	1 OR 2 TIMES	3 TO 6 TIMES	7 TO 14 TIMES	15 OR MORE
c. Extension personnel in your county.....	ALMOST NEVER	1 OR 2 TIMES	3 TO 6 TIMES	7 TO 14 TIMES	15 OR MORE
d. Extension personnel outside your county.....	ALMOST NEVER	1 OR 2 TIMES	3 TO 6 TIMES	7 TO 14 TIMES	15 OR MORE
e. Farm equipment or supply dealers, elevator personnel, salesmen or buyers..	ALMOST NEVER	1 OR 2 TIMES	3 TO 6 TIMES	7 TO 14 TIMES	15 OR MORE
f. Professionals such as farm management consultants, veterinarians or bankers...	ALMOST NEVER	1 OR 2 TIMES	3 TO 6 TIMES	7 TO 14 TIMES	15 OR MORE

4. Do you currently own a video cassette recorder (VCR) (that can be hooked up to a TV set? (Circle one)..... YES NO

   a. If yes, in the past six months have you used your VCR to watch any prerecorded tapes dealing with Agricultural Topics? (These may have been supplied by a dealer, extension, a library, or any other source) (Circle one)..... YES NO

   b. In the past six months have you recorded any agricultural programs yourself for viewing at another time or for your own reference? (Circle one)..... YES NO

5. Do you currently have a two-way mobile communication system? This can include Citizen's Band (CB) radios, 2-way FM radios, or mobile telephones (Circle one)..... YES NO

   a. If yes, do you use this mobile communication system in your farming operations? (Circle one)..... YES NO

6. Do you own a satellite antenna dish (to receive television signals from communication satellites? (Circle one)..... YES NO

   a. If yes, in the past six months have you used your satellite receiving dish to view any agricultural programs? (Circle one)..... YES NO

PLEASE TURN TO PAGE 3

7. Do you subscribe to a cable television service? ..... NO YES

8. Do you currently use any of the following agricultural information services? Please circle the appropriate response for each of the following electronic information devices.

a. Agri-view (that requires a special decoding device to receive market, weather, and pest management information over Iowa Public Television) (Please circle one response) .....NO YES

If no, do you think you will be using this service in 5 years?
YES NO NOT SURE LACK INFORMATION ABOUT IT

b. Dataline (that requires a special device to receive FM sideband signals on a monitor) (Please circle one response)..... NO YES

If no, do you think you will be using this service in 5 years?
YES NO NOT SURE LACK INFORMATION ABOUT IT

c. Exnet (Iowa State University's Interactive Computer Database System) (Please circle one response)..... NO YES

If no, do you think you will be using this service in 5 years?
YES NO NOT SURE LACK INFORMATION ABOUT IT

9. Within the past two years, have you been or are you now a member or an officer of any of the following types of organizations? (Circle ALL that apply)

a. Farm or commodity organization such as Iowa Corn Growers or Farm Bureau.....MEMBER OFFICER NEITHER

b. Civic or service group such as JC's, Rotary or Lions..... MEMBER OFFICER NEITHER

c. Farm Cooperative.....MEMBER OFFICER NEITHER

d. School board, hospital board, Extension Council, ASCS Committee or Soil Conservation Board.....MEMBER OFFICER NEITHER

10. How many farmers do you personally know who are using a computer in some way? (Please circle one number)

0 DON'T KNOW OF ANY
1 ONE
2 TWO
3 THREE
4 FOUR
5 FIVE OR MORE

11. Do you or does anyone in your household have a microcomputer (such as an IBM PC, Apple, Tandy or other type of general purpose computer)..... (Please circle one)
NO—(GO TO QUESTION 17)
YES—(GO TO QUESTION 12)

PLEASE ANSWER THE FOLLOWING IF YOUR HOUSEHOLD HAS A MICROCOMPUTER

12. When did you acquire your computer? (If you have had more than one, please indicate when you acquired your first one.) _____ (year)

13. Approximately how many hours per week is your household's computer or computers used? (Circle one number)
1 Less than 2 hours
2 3 to 5 hours
2 6 to 9 hours
3 10 to 14 hours
4 15 to 19 hours
5 20 hours or more

14. Approximately how many of these hours of computer use are directly related to your farm operation? (Please circle one)
1 Almost none
2 Less than one-fourth
3 About one-fourth
4 About one-half
5 About three-fourths
6 Nearly all

15. Who is the primary computer operator, and who are the other persons in your household who use it? (Circle one response for each person)

	Primary Operator	Also Use	Don't Use	
a. Self.....				
b. Spouse.....	Primary Operator	Also Use	Don't Use	No Spouse
c. Children.....	Primary Operator	Also Use	Don't Use	No Children at home

16. How frequently do you use your own computer for the following?
(Please circle one response for each item)

a. To keep general farm accounting records (such as income and expenses)...	NEVER	MONTHLY	WEEKLY	DAILY
b. To keep enterprise accounts (such as separate records for a beef feedlot operation or a corn crop.....	NEVER	MONTHLY	WEEKLY	DAILY
c. To run decision-aid programs for management (such as analyzing cropping and fertilizer options).....	NEVER	MONTHLY	WEEKLY	DAILY
d. To do word processing.....	NEVER	MONTHLY	WEEKLY	DAILY

PLEASE GO TO QUESTION 19

PLEASE TURN TO PAGE 5

5

PLEASE ANSWER THESE QUESTIONS IF YOU DO NOT HAVE A MICROCOMPUTER

17. Which of the following statements best describes the status of your decision regarding acquiring a computer? (Please circle one)

1 I haven't given it much thought
2 I obtained some information on computers, but I can't say I'm seriously considering getting one
3 I'm now in the process of deciding whether or not to get one
4 I have definitely decided to get a computer
5 I have definitely decided NOT to get a computer
6 I had a computer, but no longer have it

18. People have many reasons for not having a computer. For each statement below, please indicate whether or not it describes your reason(s) for currently not having a computer. (Please circle an answer for each statement)

	Please circle the appropriate response	
a. I don't want a computer on the farm.	IS A REASON	IS NOT A REASON
b. I have little need for a computer on the farm.	IS A REASON	IS NOT A REASON
c. Computers are changing so rapidly I feel it is best to wait a while before acquiring one.	IS A REASON	IS NOT A REASON
d. Computers are too costly for my budget.	IS A REASON	IS NOT A REASON

PLEASE GO TO QUESTION 19

19. Have you or other members of your household had experience with computers or computer data in school or in an off-farm job? (Circle one for each response)

a. I have	NO	YES
b. Spouse has	NO	YES
c. Other family member has	NO	YES

20. During the past few years there has been a growing debate about the financial health of farming. How do you feel about the current financial condition of each of the following? (Please circle one response for each item)

a. Iowa farmers.....	NOT A PROBLEM	A SLIGHT PROBLEM	A MODERATE PROBLEM	A VERY SERIOUS PROBLEM	NOT SURE
b. Agribusiness firms in your area.....	NOT A PROBLEM	A SLIGHT PROBLEM	A MODERATE PROBLEM	A VERY SERIOUS PROBLEM	NOT SURE
c. Financial institutions in your area.....	NOT A PROBLEM	A SLIGHT PROBLEM	A MODERATE PROBLEM	A VERY SERIOUS PROBLEM	NOT SURE
d. Your farm's financial condition.....	NOT A PROBLEM	A SLIGHT PROBLEM	A MODERATE PROBLEM	A VERY SERIOUS PROBLEM	NOT SURE

21. Listed below are some examples of computerized services which may be used to keep farming records and/or analyze farm-related problems. With these services, the farmer provides information about his farming operation to the service and it compiles, summarizes or analyzes the information using a computer. Please indicate the extent of your experience with each source of computerized services listed below.

	Your Experience with Computerized Services (Circle one response for each service)			
a. Iowa Farm Business Association, Farm Bureau, or similar financial or production record-keeping service	CURRENTLY USE	HAVE USED BUT NOT NOW	KNOW ABOUT BUT NEVER USED	NEVER HEARD OF IT
b. Record-keeping services offered by farmer cooperatives (such as Land O'Lakes or feed coops)	CURRENTLY USE	HAVE USED BUT NOT NOW	KNOW ABOUT BUT NEVER USED	NEVER HEARD OF IT
c. Record-keeping services offered by banks, accountants or other private firms	CURRENTLY USE	HAVE USED BUT NOT NOW	KNOW ABOUT BUT NEVER USED	NEVER HEARD OF IT
d. Dairy Herd Improvement Association (DHAI) computerized record keeping	CURRENTLY USE	HAVE USED BUT NOT NOW	KNOW ABOUT BUT NEVER USED	NEVER HEARD OF IT
e. Record-keeping services for livestock breeding and management offered by breed associations (such as STAGES)	CURRENTLY USE	HAVE USED BUT NOT NOW	KNOW ABOUT BUT NEVER USED	NEVER HEARD OF IT
f. Enterprise record programs or decision aid programs for crops or livestock offered by Iowa State University or your county extension office	CURRENTLY USE	HAVE USED BUT NOT NOW	KNOW ABOUT BUT NEVER USED	NEVER HEARD OF IT
g. Computer services offered by your veterinarian	CURRENTLY USE	HAVE USED BUT NOT NOW	KNOW ABOUT BUT NEVER USED	NEVER HEARD OF IT
h. Other farm-related computerized information services (please specify)_____	CURRENTLY USE	HAVE USED BUT NOT NOW	KNOW ABOUT BUT NEVER USED	NEVER HEARD OF IT

22. How close is the nearest computer dealer to where you live? (Please circle one number)

1 10 miles or less
2 Between 11 and 25 miles
3 26 or more miles
4 Don't know

PLEASE TURN TO PAGE 7

23. Some farmers believe computers will be useful in managing a farm. Others disagree. Please indicate to what extent you agree or disagree with the following statements. (If you currently own a computer, answer the questions in terms of how useful computers <u>are</u> for you).

	How strongly do you agree or disagree? (Please circle your answer)				
a. By using a computer I would be able to solve many of my own problems without relying on others.....	STRONGLY AGREE	AGREE	DON'T KNOW	DISAGREE	STRONGLY DISAGREE
b. Owning a computer will give me far greater control over my farm management decisions.....	STRONGLY AGREE	AGREE	DON'T KNOW	DISAGREE	STRONGLY DISAGREE
c. The kinds of computers being sold to farmers are just toys.....	STRONGLY AGREE	AGREE	DON'T KNOW	DISAGREE	STRONGLY DISAGREE
d. It will be very difficult to develop or modify computer programs to fit my farming operations.....	STRONGLY AGREE	AGREE	DON'T KNOW	DISAGREE	STRONGLY DISAGREE
e. Farm computers won't be economically feasible for at least five years.....	STRONGLY AGREE	AGREE	DON'T KNOW	DISAGREE	STRONGLY DISAGREE
f. It will be easier to keep my records on a computer than it is in my usual way.....	STRONGLY AGREE	AGREE	DON'T KNOW	DISAGREE	STRONGLY DISAGREE
g. Until computer programs for use on the farm are improved computers won't be worth using.....	STRONGLY AGREE	AGREE	DON'T KNOW	DISAGREE	STRONGLY DISAGREE
h. A computer will allow me to keep records that I can't keep now.....	STRONGLY AGREE	AGREE	DON'T KNOW	DISAGREE	STRONGLY DISAGREE
i. I would have a computer now, but they are too difficult to operate....	STRONGLY AGREE	AGREE	DON'T KNOW	DISAGREE	STRONGLY DISAGREE
j. Computers will make it easy to get information I need for farm management.....	STRONGLY AGREE	AGREE	DON'T KNOW	DISAGREE	STRONGLY DISAGREE
k. I am afraid I'll lose my records if I put them into a computer.....	STRONGLY AGREE	AGREE	DON'T KNOW	DISAGREE	STRONGLY DISAGREE
l. If a computer is to be useful for my farm, it will be necessary to write my own programs (or hire it done)...	STRONGLY AGREE	AGREE	DON'T KNOW	DISAGREE	STRONGLY DISAGREE
m. Computers are just for the big farmers.....	STRONGLY AGREE	AGREE	DON'T KNOW	DISAGREE	STRONGLY DISAGREE
n. My operation isn't big enough to justify owning a computer.....	STRONGLY AGREE	AGREE	DON'T KNOW	DISAGREE	STRONGLY DISAGREE
o. I'm too old to learn how to use a computer.....	STRONGLY AGREE	AGREE	DON'T KNOW	DISAGREE	STRONGLY DISAGREE

8

24. In 1988 how often have you used the following sources to obtain information about computers?

	How often within the past year have you used this source for computer information? (Please circle your answer)				
a. How often have you read articles about computers in magazines or newspapers	NEVER	ONCE	TWO TIMES	THREE TIMES	FOUR OR MORE TIMES
b. Read books or manuals about computers or computer operations	NEVER	ONCE	TWO TIMES	THREE TIMES	FOUR OR MORE TIMES
c. Written or telephoned for information from computer manufacturers or dealers	NEVER	ONCE	TWO TIMES	THREE TIMES	FOUR OR MORE TIMES
d. Visited a computer dealer	NEVER	ONCE	TWO TIMES	THREE TIMES	FOUR OR MORE TIMES
e. Attended a computer exhibit at a fair or expo	NEVER	ONCE	TWO TIMES	THREE TIMES	FOUR OR MORE TIMES
f. Taken a computer short course or workshop from a computer dealer, college or other organization	NEVER	ONCE	TWO TIMES	THREE TIMES	FOUR OR MORE TIMES
g. Attended an Extension meeting where at least part of the program was about computers	NEVER	ONCE	TWO TIMES	THREE TIMES	FOUR OR MORE TIMES
h. Talked with Extension staff about computers	NEVER	ONCE	TWO TIMES	THREE TIMES	FOUR OR MORE TIMES
i. Talked with college or high school teachers about computers	NEVER	ONCE	TWO TIMES	THREE TIMES	FOUR OR MORE TIMES
j. Talked about computers with other farmers who are using them	NEVER	ONCE	TWO TIMES	THREE TIMES	FOUR OR MORE TIMES
k. Talked about computers with non-farm users	NEVER	ONCE	TWO TIMES	THREE TIMES	FOUR OR MORE TIMES
l. Talked about computers with people who don't use computers	NEVER	ONCE	TWO TIMES	THREE TIMES	FOUR OR MORE TIMES

25. Do you receive any of the following kinds of computer publications or newsletters? (Please circle "yes" or "no" for each type)

a. FARM COMPUTER PUBLICATIONS (such as Agricultural Computing Newsletter--published by Doane's)..... NO YES

b. GENERAL COMPUTER PUBLICATIONS (such as BYTE magazine, Personal Computing, PC Magazine, PC World, etc.).....NO YES

c. MAGAZINES OR NEWSLETTERS PUBLISHED BY COMPUTER MANUFACTURERS OR DEALERS.....NO YES

PLEASE TURN TO PAGE 9

26. Below are several opinions with which some farmers agree and others disagree. Please indicate to what extent you agree or disagree with each statement.

	How strongly do you agree or disagree with each statement? (Please circle your answers)				
a. When I'm at a meeting I always feel I should be at home getting things done.....	STRONGLY AGREE	AGREE	NEUTRAL	DISAGREE	STRONGLY DISAGREE
b. Spending a day working in the field gives me a greater sense of satisfaction than spending the day working on farm records	STRONGLY AGREE	AGREE	NEUTRAL	DISAGREE	STRONGLY DISAGREE
c. Even today hard work can make up for a lack of management ability in farming.....	STRONGLY AGREE	AGREE	NEUTRAL	DISAGREE	STRONGLY DISAGREE
d. Time spent by a farmer in keeping records is generally more profitable than time spent on the tractor.....	STRONGLY AGREE	AGREE	NEUTRAL	DISAGREE	STRONGLY DISAGREE
e. Keeping records in farming takes more time than they are worth....	STRONGLY AGREE	AGREE	NEUTRAL	DISAGREE	STRONGLY DISAGREE

27. Did you use a formalized record keeping system for your 1988 farm financial information? (This might have been a record book, such as Iowa State's Better Farm Accounting, or a service such as PCA's "AGRIFAX" or Iowa Farm Bureau's Farm Record Service.) (Please circle one)

1 NO
2 YES

28. How frequently do you make, or have made for you, a cash flow analysis for your farm operation? (Please circle one number)

1 NEVER
2 LESS THAN ONCE EACH YEAR
3 AT LEAST ONCE EACH YEAR
4 2 TO 4 TIMES EACH YEAR
5 MORE THAN 4 TIMES EACH YEAR

29. How often do you make forward contracts? (Forward contracting is when you agree to sell a commodity ahead of time, but don't take the risk that you would on the futures market.) (Please circle one number)

1 NEVER
2 OCCASIONALLY
3 OFTEN
4 VERY OFTEN

30. How often do you use hedging? (Hedging involves making multiple transactions on the futures market so as to minimize your risks.) (Circle one number)

1 NEVER
2 OCCASIONALLY
3 OFTEN
4 VERY OFTEN

31. Do you practice enterprise accounting? That is, do you maintain separate records on different farm operations? Such records might include a swine enterprise record book, a beef feedlot record book, or records on specific crops such as corn or soybeans.

1 NO
2 YES

I KEEP ENTERPRISE RECORDS ON: (Circle the numbers of ALL that apply)

1 BEEF
2 DAIRY
3 SWINE
4 CORN
5 SOYBEANS
6 OTHER (Please specify)_____

Finally, we need to know a little about you and your farm operation.

32. Excluding woodlands, ditches and lanes, how many acres did you own or rent in 1988?

_____ ACRES OWNED _____ ACRES RENTED

33. Approximately how many acres of each of the following crops did you have in 1988?

CORN....._____ ACRES
SOYBEANS....._____ ACRES
OTHER GRAINS....._____ ACRES

34. Approximately how many of each of the following types of livestock did you sell in 1988?

FED CATTLE....._____ HEAD SOLD
MARKET HOGS....._____ HEAD SOLD
FEEDER PIGS....._____ HEAD SOLD

35. Approximately how many of each of the following types of livestock did you have in your herd during 1988?

DAIRY COWS....._____ HEAD IN HERD
BEEF COWS....._____ HEAD IN HERD
SOWS....._____ HEAD IN HERD

36. In what county do you reside?_____

37. How old were you on your last birthday?_____ YEARS OLD

38. Are you:_____ MALE _____ FEMALE

PLEASE TURN TO PAGE 11

39. Which of the income categories below best estimates your average gross income from the sale of crops, livestock, livestock products and government payments during the past three years--that is, the average for 1986, 1987 and 1988? (Please circle one number)

1 Under $20,000
2 $20,000 to 39,999
3 $40,000 to 99,999
4 $100,000 to 199,999
5 $200,000 or more

40. Are you married? NO—GO TO QUESTION 41
YES—

What is your spouse's role for each of the following items.
(Please circle one response for each item)

a. To what extent is your spouse involved in the farming operation?	NEVER	SOMETIMES	OFTEN	VERY OFTEN
b. To what extent is your spouse involved in farm record keeping?	NEVER	SOMETIMES	OFTEN	VERY OFTEN
c. To what extent does your spouse help collect information to make farm decisions?	NEVER	SOMETIMES	OFTEN	VERY OFTEN

41. During 1988 were you and/or your spouse employed off the farm?

You	Spouse
1 NO	1 SINGLE, NO SPOUSE
2 YES—If yes, approximately how many days did you work off the farm in 1988?_____days.	2 NO
	3 YES—If yes, approximately how many days did your spouse work off the farm in 1988? _____ days.

42. How many years of formal schooling did you complete? (Please circle one)

1 1-8 YEARS (Elementary School)
2 9-11 YEARS (Attended some High School)
3 12 YEARS (Graduated High School)
4 13-15 YEARS (Attended College)
5 16 OR MORE YEARS (Graduated College)

43. Do you expect that you will be engaged in farming in five years?
(Please circle one answer) YES NO NOT SURE

R 1989 THANK YOU FOR YOUR COOPERATION

Please return your completed questionnaire in the enclosed postage paid envelope.