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Southwest Michigan fruit and vegetable farmers' use of sources and channels to gain information in regard to new agricultural practices

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SOUTHWEST MICHIGAN FRUIT AND VEGETABLE FARMERS' USE OF SOURCES AND CHANNELS TO GAIN INFORMATION IN REGARD TO NEW AGRICULTURAL PRACTICES

By

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ABSTRACT

SOUTHWEST MICHIGAN FRUIT AND VEGETABLE FARMERS' USE OF SOURCES AND CHANNELS TO GAIN INFORMATION IN REGARD TO NEW AGRICULTURAL PRACTICES

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In 1990, many sources and channels of information for new agricultural practices influenced farmers. It became necessary for formal and non-formal agriculture educators to understand the use of these sources and channels to better disseminate information and market this information to clientele. This study was designed to determine the sources and channels of information and to determine if selected personal and demographic characteristics have an effect on methods that farmers use in gaining information on new agricultural practices.

A random sample was drawn from a population of fruit and vegetable farmers from mailing lists in five counties of Southwest Michigan including Allegan, Berrien, Cass, Kalamazoo and Van Buren. Information regarding Frequency of use of sources and channels, selected personal and farm characteristics were collected by mail using a questionnaire.

Analysis of the data showed that of eleven sources listed farmers ranked Cooperative Extension Service Personnel, Product Company Representatives and other farmers, both Family and Non-Family Members, at the top. Sources ranking at or near the bottom were Farmers Home Administration Personnel and Vocational Agriculture

Teachers. Ranking at the top of the 18 channels listed, were farm magazines, Agricultural Bulletins from Michigan State University and other universities, and Weekly or Monthly Newsletters. Channels that were seldom or never used for receiving information included Video Tape and Microcomputer Communications.

It was concluded that respondents were similar in personal and farming characteristics. Respondents used traditional sources and channels of information delivery. Young farmers and farmers with their main income from the farm, used a larger number of sources and channels.

It was implied that Michigan State University should continue to support field positions in fruit and vegetables, and these positions increase their writing and submitting of articles to farm magazines. Also recommended was that agricultural educators continue to improve agricultural bulletins containing agricultural information, and be responsive to new technologies, such as video tape and microcomputer communications.

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Finally, a very special thank you to the author's wife, Sheri, for her understanding, encouragement, patience and love that made the completion of this study possible.

The author dedicates this study to his mother and father for their love and belief in education for their son.

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CHAPTER I

INTRODUCTION

In 1990, farmers had many sources and channels of information which influenced their agricultural education and farming operations. Previous studies showed that farmers locked on to one or two major types of sources and channels, because profitability depended on accurate, concise and understandable information. Farm population in the 1980's was declining and among this population the number of part-time farmers was increasing. These farmers had less time than their full-time counterparts to gather the information they needed to increase productivity. It, therefore, became necessary for both formal and non-formal educators to understand better, the sources and channels these farmers used to receive information about new agricultural practices. They needed a wider knowledge of the basics of delivery methods. They also needed to keep up with the changing technology in order to effectively market information to their changing farm clientele.

In 1990, increased costs of delivering current and up-to-date educational information was primarily due to increases in postage. The Cooperative Extension Service, especially the County Extension Director, had to utilize the most economical and accessible methods of reaching clientele with educational information on new agricultural practices. County Extension Directors and Agents were using a multitude of delivery

channels. Channels included local radio, newsletters, direct mailings, local newspapers and agricultural bulletins. Popular channels such as farm magazines, video tapes, television and computer programs were expensive. Few of these channels were available for county-wide programming of educational information. Radio and television could not afford to provide public service or broadcast information on new agricultural practices at low cost because agricultural populations had dwindled over the past decades (Census of Agriculture Untied States 1989). Small broadcast news stations that previously provided these sources, had enlarged to cover increased cost, and changing audiences. Without the use of biased commercials or sponsorships, popular channels were financially out of range of agricultural educators.

During the review of the literature, the author found patterns which began as early as 1958. Farmers were often confused between sources of information and channels of information. They often mistook the channels as the source of information. This was evident when they decided where they received information on new agricultural practices. In most all the literature, neighboring farmers and farm magazines were rated at or near the top, as a source or channel of information. Another pattern was, the more educated the farmer or more profitable the farm, the greater the number of sources or channels were used in gaining new agricultural information. Cooperative Extension agents ranked below other channels or sources, usually second to sixth on a rating scale of usefulness in determining new agricultural information. Most of the information shared through channels, such as radio programs and farm magazines, were either written by Extension agents or University specialists working for Extension.

It was a challenge for County Extension Directors to further utilize these channels of farm magazines and farm journals to effectively distribute information on new agricultural practices to farmers. They needed to better understand which sources and which channels farmers used to gain information on farming practices and techniques.

Purpose and Objectives of the Study

The educational value of this study was to help both formal and non-formal agricultural educators in contacting the fruit and vegetable farm clientele of Southwest Michigan. It was designed to assist Cooperative Extension Agents, Vocational Agricultural Teachers and other groups of educators, in identifying which sources and through what different channels farmers received information on new agricultural practices.

The purpose of this study was:

1. To determine the use of sources and channels to gain information on new agricultural practices by fruit and vegetable farmers in Southwest Michigan.

2. To determine if selected personal and demographic characteristics had an effect on sources or channels of information farmers used in gaining information on new agricultural practices.

The objectives of the study were:

1. To determine which sources of information, fruit and vegetable farmers in selected Southwest Michigan counties used, to receive information on agricultural practices.

2. To determine what channels of information, fruit and vegetable farmers in selected Southwest Michigan counties used, to receive information on agricultural practices.

3. To determine if part-time farmers differ from full-time farmers in their selection of sources or channels of information concerning new agricultural practices of fruit and vegetable farming in Southwest Michigan.

4. To determine if there is any relationship between the age of a farmer and the sources or channels used, by fruit and vegetable farmers of Southwest Michigan to receive information concerning new agricultural practices.

5. To determine if the size, in number of acres, of a farming operation governed which sources or channels fruit and vegetable farmers of Southwest Michigan used to receive information on new agricultural practices.

6. To determine if the number of years a person has been in fruit and vegetable farming had a relationship to the source or channel for receiving information on new agricultural practices.

7. To determine if the number of years of formal education had a relationship to the source or channel used by fruit and vegetable farmers to receive information about new agricultural practices.

8. To determine if the gross dollar earnings from the fruit and vegetable farm affected which sources or channels farmers selected to receive information concerning new agricultural practices.

Research Questions

The primary purpose of this study was to identify use of sources and channels of information by fruit and vegetable growers in Southwest Michigan. The second purpose was to determine if selected personal and demographic characteristics had an effect on which sources and channels of information farmers used in gaining information on new agricultural practices. It was expected by the researcher that certain patterns be identified when tabulating data. Specific research questions to be answered by this study were as follows:

1. What was the frequency of use of selected sources and selected channels of information, by fruit and vegetable farmers selected from five selected counties in Southwest Michigan, to gain information on new agricultural practices?

2. Does the size of the farm in acres affect the use of sources or channels for gaining information on new agricultural practices used by fruit and vegetable farmers in five selected counties in Southwest Michigan?

3. Does the gross dollar earnings of the farm influence a farmer's use of sources or channels for gaining information on new agricultural practices used by fruit and vegetable farmers of five selected counties in Southwest Michigan?

4. Does the time a farmer spends working off the farm, make a difference in the use of sources or channels for gaining information on new agricultural practices used by fruit and vegetable farmers of five selected counties in Southwest Michigan?

5. Does the age of a farmer have an effect on use of sources or channels for gaining information on new agricultural practices used by fruit and vegetable farmers of five selected counties in Southwest Michigan?

6. Does the amount or level of formal education a farmer has, have an effect on use of sources or channels for gaining information on new agricultural practices used by fruit and vegetable farmers of five selected counties in Southwest Michigan?

7. Does the number of years a person has been farming have an effect on the use of sources or channels for gaining information on new agricultural practices used by fruit and vegetable farmers of five selected counties in Southwest Michigan?

8. Does gender have an effect on use of sources or channels for gaining information on new agricultural practices by fruit and vegetable farmers of five selected counties in Southwest Michigan?

9. Does type of farm ownership affect the use of sources or channels for gaining information on new agricultural practices used by fruit and vegetable farmers of selected five counties in Southwest Michigan?

Definitions of Terms Used in the Study

Agricultural Practices - A technique a farmer uses to enhance or maintain profitability of a farm by using a machine, concept, cultural practice, or behavior, such as no-till

farming methods, irrigation, selective weed control, forward price contracting, etc.

Farm Operator - The owner/operator of agribusiness ventures with intent of raising for profit, field crops, livestock, greenhouse, fruit or vegetable material.

Agricultural Educators - Those individuals who give formal or non-formal agricultural education to farm operators or other individuals.

Agricultural Education - The process of learning competencies in the area of agriculture, through formal or non-formal methods.

Formal Education - Public school or education programs designed for those who have declared an interest in a specific educational subject matter area and have registered for class. Those enrolled pay an enrollment fee and agree to abide by a set of rules of an institution. Those who complete these programs usually receive some type of certificate or degree.

Non-formal Education - The selection of information and competencies, developed by an individual in a non-structured manner, with use of books, articles, newspapers, or magazines, or by attending specialized seminars or informational meetings. Usually not taken for credit or certification.

Part-time Farmer - An individual who works more than one hundred days off the farm in a non agricultural job.

Source of Information - The person or institution which provides information based on research or first-hand experience with agricultural practices.

Channels of Information - The method of delivery information, such as a type of written media or video.

ASCS - Agricultural Stabilization Conservation Service

CES - Cooperative Extension Service

FmHA - Farmers Home Administration of Michigan

SCS - Soil Conservation Service

Survey Design

The survey was completed by a randomly selected group of farm operators. Random selection means each farmer had an equal chance of being selected to take part in the study. This kind of selection ensured reliability of the study.

Farmers selected for this study represented a cross section of fruit and vegetable farmers in selected Southwest Michigan counties who were on the mailing lists of Cooperative Extension Service offices of Allegan, Berrien, Cass, Kalamazoo and Van Buren counties. These Southwest Michigan farms represented one fourth of all fruit and vegetable farmers in the State of Michigan (Census of Agriculture Unites States 1989). From these five counties a list of farmers, was produced. From this list of 970 farmers, 275 names were randomly selected and were sent the surveying instrument, along with a cover letter explaining the survey and instructions for completion (see Appendix A and B). Research was based on the responses to the survey.

Reasons for selecting 275 names are explained in Statistical Methods In Education and Psychology (Borg and Gall 1983) and in course work of CEP 904 and CEP 905. With correct random selection high validity would be achieved. Two hundred and seventy-five names were selected to account for surveys that would not be returned or returned partially answered.

The instrument was divided into two sections. Section one asked farmers to rate

frequency of use of eleven sources from which they received information on new agricultural practices. It also asked farmers to rate frequency of use of channels from which they received information on new agricultural practices.

The second section of the survey instrument collected background information on each farmer and the farm he or she operates. Information included age, gender of the farmer, size of operation in acres, gross dollar earnings of the farm, number of days worked off the farm in the past year, number of years of formal education of the farmer, number of years in farming, and type of farm ownership. Patterns and differences in primary and secondary questions were analyzed statistically using the computer software SPSS PC+. Each major area was described statistically and commonalties or differences were shown and reported through tables, figures and narratives.

Assumptions and Limitations of the Study

Focus of this study was the frequency of use of sources and channels of information for receiving information on new agricultural practices by Southwest Michigan fruit and vegetable farmers. An assumption was made that farmers who responded to the questionnaire were sincere in answering their questions. Another assumption was that there was no difference between farmers who had been selected and those who had not been selected by the random sampling method.

Southwest Michigan had a wide variety of farm operations because of its diverse resources of soils, water and climate. Fruit and vegetable farmers were chosen because they represented varied marketing and management strategies used in farming, and for their varied size and potential dollar earnings.

As with other investigations limitations foreseen and unforseen, are recognized and listed. Following is a list of limitations:

1) This study was based on a population which was drawn from names that were on mailing lists of the county Cooperative Extension Service in five counties in Southwest Michigan. This study may have populations of early adopters which used fewer adoption stages. Clientele had to actively place their names on these list.

2) Other sources and channels could have been used by farm clientele, but space, funding and practicality required that choices of sources and channels be narrowed.

3) It is difficult to determine the exact number of fruit and vegetable farmers in Southwest Michigan. The State of Michigan statistical service did have lists which were more complete. These lists are protected from anyone outside the United States Statistical Service.

Overview of the Dissertation

A background and relevance of the study was developed in Chapter I. Introduction to need, problems and objectives are presented. Research questions are explained to identify certain factors, followed by a definition of terms used by the author. An explanation or overview of research design, and limitations to the study are given.

In Chapter II, related literature was presented. These studies gave both foundation and history to the study, with specifics on the farmer's sources and channels of information on new agricultural practices.

Chapter III contains information on how the study was designed and implemented. This included the population description, sample description, instrumentation, validity and reliability measures, distribution and collection of the questionnaire and framework

of data analysis.

Each question from the survey instrument was explained in Chapter IV by using charts, tables, and narrative formats. Chapter V contained a summary of the study, conclusions and observations of the study by the author, implications and recommendations for further research.

Summary

The challenge of delivery of information to farmers by agricultural educators was explained in the introduction. Purpose and objectives were developed along with research questions to be reviewed in the literature. Definitions of terms unfamiliar to readers were given. Survey design, assumptions, limitations and the dissertation overview were stated.

CHAPTER II

PRECEDENTS IN THE LITERATURE

The use of selected sources and selected channels by farmers to gain information about agricultural practices was documented in various dissertations, articles in journals and bulletins. This study was completed by a review of the literature from available sources. Summaries of like studies were reviewed for key words. A computer bibliography search using these key words was done at the Michigan State University Library. The sources searched were from Eric and Eric on Compact Disk Rom, dissertation abstracts, Summary of Studies in Agricultural Education and Summaries of Studies in Extension Education.

Adoption of Practices

In his "Adoption of New Ideas and Practices", Herbert F. Lionberger of the Department of Sociology at the University of Missouri, Columbus, Missouri presented a summary of research, explaining the acceptance of technological advances in agriculture with implications for facilitating change. This work was a review of studies completed prior to 1960 on the subject of communications and adoption of ideas, by farmers in many communities in rural states.

Lionberger stated that the decision to adopt new practices, usually takes time. "People normally do not adopt a new practice or idea as soon as they hear about it"

(P.3). For many practices, people appear to go through a series of distinguishable stages: awareness, interest, evaluation, trial, final adoption. Lionberger states that final adoption was not always permanent. He discussed information sources and how they varied their position in the adoption cycle.

Lionberger continued with the awareness stage, stating that mass media, newspapers, magazines, radio and television were the most frequent channels of information about new ideas and practices. There was one exception, the late adopter. He was more likely to first learn about a practice from other farmers. Lionberger also stated that in the second stage, various agricultural agencies were likely to be important particularly for early adopters. Well-regarded farmers become a useful source during the evaluation stage. For the trial stage or, "How do I apply it stage?", frequent sources were salesmen and dealers (P.6). They commonly supply answers to questions concerning commercial products. Other farmers continue to be important during this stage. For complex practices, the county agent, vocational agricultural teacher and other professionals, who are not specialists, were used.

In the final adoption stage, the farmer looks towards government personnel, industry, and other successful farmers to help reinforce decisions he has made. Lionberger concluded by stating that mass media was used as a quick and efficient means of notifying farmers of new developments. Lionberger recommended mass media be used by universities to disseminate information. Often a resourceful farmer was directly linked to information sources and becomes a pass-through. As a pass through, a farmer passed information from agricultural agents, Vocational Agriculture teachers and experiment stations to other farmers. In some cases they did not pass on complete

information and in turn corrupted and evaluated what they were communicating. They become ". . .influences and innovators and gain status within the community as information gate keepers" (P.9).

Lionberger also discovered that individual farmers acted as sources of information to other farmers. They were able to pass on what they read, heard or had seen others do. Farmers who were late adopters in farm practices were often willing to accept advice from these fellow farm producers.

The 1950s

As a part of his dissertation Russell G. Mawby published his findings, entitled "Types and Sources of Information Used by Farmers in Michigan with Implications for Extension Programming" in 1959 at Michigan State University. Data for this dissertation was collected from 199 southern Michigan farms in the summer of 1954. In his introduction, Mawby stated that farmers in different positions employed different patterns of sources of communications when securing a given type of information. Variations and patterns in sources employed were associated with the amount of formal education, background experiences, personal situations, scale of the operation, type of farm and number of educational meetings attended. Farmers with higher educational degrees and farming experience sought Michigan State University Cooperative Extension personnel and research specialists. Mawby stated that farmers with different personal and farm characteristics used a given source of information in the same pattern.

Mawby was looking at ways in which farmers received information useful in solving problems. He hoped that the Cooperative Extension Service of Michigan would

be better able to determine programs and delivery channels based on his study. The study concerned itself with types of information considered important by farmers and sources of communication of information.

In his study, Mawby used data from the Interstate Managerial Survey, a cooperative interdisciplinary regional study. Agricultural economists and sociologists from the seven states of Indiana, Iowa, Kansas, Kentucky, Michigan, North Dakota and Ohio were involved. Farmers surveyed managed farms producing a minimum of $2,500 worth of farm products. Mawby's sample involved counties south of a line from Bay City to Muskegon. Information requested was based on five categories: 1) prices revealed for products, 2) production factors, 3) new developments, 4) human factors, political, social and 5) institutional factors (P.50,51). Mawby measured the use of information against these five categories.

Mawby stated that individuals receiving information for "maximizing profits, desire different patterns than do those who receive it to maximize family satisfactions" (P. 14, 15). He concluded that different communicative sources of information were used in differing degrees to securing five types of information, by employing eight communicative sources in sub-groupings established for each different variable in the study. Mawby determined groupings to be farm organizations, land grant systems, commercial people, professional counselors, neighbors, relatives, farm magazines, newspapers, radio and television. He concluded that farmers, ranked the various sources differently when a selection was available based on their education, size of their operation, their background, and personal situation.

A summary, of the sources of production information indicated by respondents,

showed that the University Land Grant System was the most useful. Farm magazines were a strong second. Radio and television were next, followed by neighbors and relatives. Mawby stated that commercial people, professional counselors and farm organizations were relatively unimportant sources of production information.

Another study in the 1950s included John David Todd's thesis at the University of Tennessee in 1959, entitled "The Attitude of Adult Farmers Toward Adult Education in Vocational Agriculture in the Eagleville School area of Rutherford County, Tennessee." Todd presented data showing the status of farmers, their background and attitude toward adult education programs. Sources of information were used for changes or trends in agriculture. Todd found that farmers used adult education classes, visits by an agricultural teacher, visits by County Extension Agents and visits to the County Extension Office, magazines, newspapers, seed and fertilizer dealers, radio and television and other farmers as sources of information. Todd measured these sources against the number of years farmers had been in agriculture, their age, size of their operation and number of classes they attended for formal agricultural adult education.

Todd's results stated that magazines and other farmers were leading sources of information. Farmers used these sources of information to make changes in farming practices or to look at trends in agriculture. Twenty-six percent of the farmers reported using both adult classes and seed and fertilizer dealers as sources of information. Radio and television reports were highly ranked. Only six percent used County Agricultural Agents as a source of information. A small number of farmers said they used their own judgement in agricultural practices (P. 10).

The 1960s

Progress report 111 "Trends in use of Recommended Farm Practices and of Farm Information Sources in 12 Kentucky Neighborhoods" by C. Milton Cougheuour and N.B. Patel in 1962 was a summary and an interpretation of findings of surveys conducted in 1950, 1955, and 1960. It examined the use of 14 farming practices by farm operators in twelve Kentucky neighborhoods. Farmers were broken down by educational levels. Farmers were to select several practices gained and sources of information used in their farming operations. Coughenour and Patel reported an increase in use of all sources of information from 1950 to 1955. After 1955 all sources, except radio and television which were introduced in 1955, declined as a source of information. Coughenour and Patle suggested that influential factors causing this shift were of a general nature rather than specific to certain groups of farmers (P.7).

Four reasons were given for this shift in use of sources of information; shift of agricultural agencies from personal contact to using the radio and television; a change in the leadership of agricultural agencies; depressed conditions reduced motivation to use agencies and diminishing local leadership of the organizations.

Farmers were asked to state whether they received any farm information from a list of 14 sources. The sources investigated were Cooperative Extension Service personnel, Soil Conservation Service, Agricultural Stabilization Conservation programs, vocational agricultural teachers, Kentucky Agricultural Experiment Station, newspapers, magazines, radio, television, farm meetings, Extension letters, farm bulletins and dealers and salesmen. It was noted that there was a general overall decline in the use of various sources except radio and television. Radio scored very high as a media or channel of

information. Farm magazines ranked second and county agricultural letters ranked third.

The tables within the study showed that as land useability increased for different types of farming, use of media and agricultural agencies for information also increased. This was also true when the value of crops was broken down in neighborhoods. High income neighborhoods utilized sources of information at an increased level. Findings were taken from four studies completed within five years. The report was completed by the Extension Editorial staff in 1963. The report stated that farmers did not differentiate clearly between information sources and information channels. For example, ". . . neighbors and friends may have got their information from farm magazines in which case the magazine is identified as a source, however, farm magazines may have gotten the information from commercial firms or the College of Agriculture, in which case the magazine is identified as a channel" (P.1).

The studies showed that farm magazines ranked very high as a source of farm news. Also friends and neighbors and the farm advisor from Cooperative Extension Service ranked very high. Those sources at the bottom were Vocational Agricultural Teachers. These studies looked at specific types of information. Ranking also depended on the types of information needed. For instance, if a source of information was on typical small grain varieties, a neighbor or county farm advisor ranked at the top. For sources of information on income tax experience, lawyers and certified public accountants ranked at the top. For pasture improvement and saving on planting time, county farm advisors and the farmer's experience made up the top two percent reporting.

One of the four studies did differentiate between channels of communications and asked growers to rank the most important channels. The top three channels were talking

with neighbors and friends, reading farm magazines and talking with a farm advisor. Those which received no rank and were at the bottom of the list, were attending meetings at the University of Illinois, attending meetings of farm organizations, or listening to farm news and information on radio.

The final table given in the bulletin ranked the summary of information sources from each of the four studies. Ranking in the top four were neighbors and friends, farm magazines, the College of Agriculture and farm advisors. The bottom four included personal experience, radio, television and special services.

In a study by Richard Leslie Lee, PhD, University of Iowa in 1967, entitled "The Flow of Information to Disadvantaged Farmers", it was observed that disadvantaged farmers from 204 farms in two southern Missouri counties had ten commonly available sources of farm information. Sources most often selected were, farm newspapers, farm magazines, farm radio shows, television shows, County Extension Agents, Vocational Agriculture Teachers, friends and neighbors, farm dealers and salesmen, college bulletins and almanacs.

A Chi-square analysis of systematic differential data indicated that there were significant differences between middle class and economically disadvantaged farmers in using these sources of information. Lee stated that disadvantaged farmers, less than 40 years old, had significantly less positive judgments of friends and neighbors, dealers, salesman, and collective personnel sources than older economically disadvantaged farmers. The better educated, economically disadvantaged farmers with more than eight years of education, had a more positive view of collective mass media, Vocational Agriculture Teachers and collective personnel sources. However, they had a less positive

view of radio, friends and neighbors, dealers, salesmen and almanacs than did the less educated economically disadvantaged farmer.

Lee's data also indicated that middle-class farmers made far greater use of mass media information sources and other additional sources of farm information. They had larger farms and had been farming longer. They were aware of, and used recommended farm practices at an increased rate. These farmers were active in more organizations, were better educated, and had increasingly more optimistic views of farming than their low income counterparts.

In a study by Jerry Lee Webb, "An Analysis of Delaware Farmers' Sources of Farm News and Information" completed in 1968, the goal was to find uses of media by farmers. His survey instrument included various kinds of farm news and information, this would help determine specific messages that could be used to develop recommendations for improving the flow of farm news and information by the Cooperative Extension Service.

Webb reported that farmers in Delaware received an average of 3.62 farm magazines and newspapers, 1.5 daily newspapers and 1.35 weekly newspapers (P.24-32). They had access to both radio and television. Farm magazines were rated high as a source of information, followed by University of Delaware specialists, county agents, other farmers, newspapers, sales representatives and dealers. Both weekly and daily newspapers received by farmers did not contain enough farm information and were not considered by farmers as important except as sources for farm market information. Webb also reported, "one of the serious questions facing the Cooperative Extension Service is how it can continue to serve a declining farm population that demands more

sophisticated services and programs, and at the same time serve a growing non-agricultural audience" (P.2).

The 1970s

In 1979, Calvin Jones, Paul B. Sheatsley and Arthur L. Stinchcombe completed a report on the "Dakota Farmers and Ranchers Evaluate Crop and Livestock Surveys" for the National Opinion Research Center. This research involved telephone interview surveys in 1978, of 1,681 farmers of North and South Dakota. These farmers divided into those who produce crops, and those who raise livestock and also by the size and scale of their operation, large versus small. The questionnaires were divided in two major sections. One dealt with the information gathering strategies of operators. The other was their attitudes and beliefs about the quality of USDA crop and livestock information. Farmers reported they received most of their crop and livestock information from magazines, journals or newsletters (35%), mass media including newspapers, radio or television (20%), agricultural agents including university, ASCS, and Extension (16%), government documents including USDA publications and reports (13%), personal contacts including business or friends (6%) and all other sources of information (3%). "In general periodicals, other media and agricultural agents are each more commonly named as primary sources than our government publications" (P.16).

In their study "The Iowa Adult Farmer Perceptions and Value of Educational Programs", Kenneth L. Smith and Allyn Kahler (1982) attempted to determine the level of participation in educational programs by Iowa farmers. Smith and Kahler assessed the perception of the value of selected educational factors. They related these factors to the

agricultural-economic conditions of the group of Iowa farmers.

The population included 219 producers from a previous study by Crawford in 1968. They looked at perceived value of sources of technical information which ranked on a scale from 1 to 9 with 1 being of no value and 9 being of great value. Farm magazines received a rank of 6.4, commercial companies-5.7, radio for agriculture-5.6, agriculture bulletins-5.1, County Agricultural Stabilization and Conservation Service personnel-5.0, County Cooperative Extension Service personnel-4.6, Soil Conservation Service personnel-4.6, daily newspaper-4.6, television for agriculture-4.5, vocational agriculture teachers-2.9 Land Grant College personnel-2.9 and Farmers Home Administration personnel a ranking of 2.4 (P.46).

Smith and Kahler stated that farmers should be exposed more to services provided by Cooperative Extension, Vocational Agriculture teachers and other segments of Land Grant Colleges. Information could be delivered through media, such as farm magazine since farmers continued to perceive publications as valuable sources of information.

A study on "Information Needs and Sources of Alabama Farmers", was conducted in 1979 by James L. Stallings and George L. Harrison and published in the Journal of Alabama Academy of Sciences. At the time, there was an interest in Alabama in the kind of information farmers needed for operating their farm business and where they received this information from. Objectives for determining sources of information used by farmers, were listed by several categories, including frequency of use, kind of information needed, commodity groups, gross farm income level, years of formal education and age of operator. A questionnaire was mailed to a sample of 1,335 farmers in Alabama in April of 1977. Eighty-five percent of Alabama farmers reported that farm

magazines were used as a source for some of the information needed running their farm business (P.136). Other farmers or key farmers, were a source for 78% of the farmers (P.136).

The authors listed these sources as print media, electronic media and personal sources. Of print media, besides farm magazines, crop and livestock reporting service showed a 60% use and newspapers a 59% use. Radio programs and television programs showed more than 50% use. Personal sources, other farmers, farm supply stores and cooperatives, county ASCS offices and county Extension offices along with fertilizer dealers and salesmen and experiment station specialists, showed over 50% use. Vocational agricultural teachers and meetings at the university were very low, with 22% use or lower.

Depending on the kind of information, other sources showed higher percentages. If the kind of information was for fertilizer, insecticide or herbicide, then fertilizer and chemical dealers or sales representatives showed a higher frequency of use. If prices of crops and livestock were needed, radio was the most reported source. Newspapers and television ranked within the top three. When identifying new farm practices in crop and livestock enterprises, farm magazines were the number one source for these kinds of information. Other farmers and county Extension offices ranked second or third for all information of this type (P.140).

Generalizations were made by sources and by farm income levels. Use of different sources of information goes up as the level of gross farm income level rises (P. 144). Different sources of information were used more, as education levels rose. The relationship was true for most sources requiring reading, such as farm magazines and

newspapers but less for radio and television (P. 144). Stallings and Harrison state, "there was no consistent relationship between age and use of different specific sources of information" (P. 144).

The 1980s

Richard L. Farnsworth and L. Joe Moffitt conducted a study entitled "Farmer Perceptions and Information Resources: A Quantitative Analysis for Agriculture Economics Research" (winter, 1984). Their purpose was to investigate the role of public and private information sources for informing farmers of yields of cotton plantations in the California San Quinton Valley. Farnsworth and Moffitt stated that farmers frequently sought information from multiple sources.

Farnsworth and Moffitt concluded that growers used publications to learn about new products or practices. Most farmers relied on other sources to learn about applications of new products and ideas than ones which Farnsworth and Moffitt listed it in their surveys. Results were inconclusive for Cooperative Extension Service research personnel and other agricultural scientists. In their conclusions, they stated, "information occupies an important position in the uncertain work environment, with which farmers are involved" (P. 11).

In his study "Delivery of Agricultural Information to Small Farmers" completed at the University of Missouri, Columbia, Milton N. Okai (1986) states that his purpose was to look at how the farmer perceived the importance of agricultural information and that of various program delivery systems. Farmers were grouped on the basis of age, educational level, years of farming, gross income from the farm, size of the farm,

enterprises produced, prices received and types of farm businesses. Sources and channels that Okai considered were newspapers, magazines, radio and television, vocational agriculture teachers, Cooperative Extension Service publications, friends and neighbors, commercial dealers and area Cooperative Extension Service assistants.

Okai's study consisted of 200 small farm families enrolled in the Small Farm programming in Southeastern Missouri. Forty farmers were selected randomly. Data was collected by personal interviews. He found the more educated the farmers, the more they sought professional information. Farmers ranked Cooperative Extension Service educational assistants, Cooperative Extension Service publications, friends and neighbors, radio and television, newspapers and magazines, commercial dealers, area Extension specialists and Vocational Agriculture instructors in that order. Farmers who had large farms relied on newspapers and magazines more than farmers who had fewer acres to farm.

Conclusions and Directions From Literature

A review of the literature and research studies through the 1950's and early 1960's revealed that many farmers reported receiving information primarily from other farmers and secondly from farm magazines along with other sources. (Lionberger 1960 and Mawby 1959). As the decade changed, studies conducted in the 1970's by Webb, using Delaware farmers, found farm magazines moving to the top of the list. In the study by Calvin C. Jones (1979), agriculture agents and university personnel rated higher than the sources listed in the studies completed of 1950s and 1960s.

One of the important points brought out in most studies was the more educated

the farmer, the more he sought additional information sources. Another underlying theme was the higher the gross earnings, the more diverse the source of agricultural information used. Many traditional sources used, were other farmers and farm magazines (Stallings and Harrison, 1979). Studies found farmers continued to perceive publications as valuable sources of information (Smith and Kahler, 1982).

Hypotheses to be Tested

The literature reviewed by the researcher revealed many ways in which the study objectives of the study and research questions could be tested. The hypotheses stated were determined after reviewing past studies and from the research questions given in Chapter I.

Hypothesis 1: There is a significant relationship between the age of the farmer and the identified sources of information, used by fruit and vegetable farmers of Southwest Michigan, for new agricultural practices.

Hypothesis 2: There is a significant relationship between the age of the farmer and the identified channels of information, used by fruit and vegetable farmers of Southwest Michigan, for new agricultural practices.

Hypothesis 3: There is a significant relationship between the number of years in farming and identified sources of information, used by fruit and vegetable farmers of Southwest Michigan, for new agricultural practices.

Hypothesis 4: There is a significant relationship between the number of years in farming and identified channels of information, used by fruit and vegetable farmers of Southwest Michigan, for new agricultural practices.

Hypothesis 5: There is a significant relationship between the size of the farm in acres and identified sources of information, used by fruit and vegetable farmers of Southwest Michigan, for new agricultural practices.

Hypothesis 6: There is a significant relationship between the size of the farm in acres and identified channels of information, used by fruit and vegetable farmers of Southwest Michigan, for new agricultural practices.

Hypothesis 7: There is a significant difference between male farmers and female farmers, with regard to the use of identified sources of information for new agricultural practices, among the fruit and vegetable farmers of Southwest Michigan.

Hypothesis 8: There is a significant difference between male farmers and female farmers, with regard to the use of identified channels of information for new agricultural practices, among the fruit and vegetable farmers of Southwest Michigan.

Hypothesis 9: There is a significant difference between full-time farmers and part-time farmers, with regard to the use of identified sources of information for new agricultural practices, among the fruit and vegetable farmers of Southwest Michigan.

Hypothesis 10: There is a significant difference between full-time and part-time farmers, with regard to the use of identified channels of information for new agricultural practices, among the fruit and vegetable farmers of Southwest Michigan.

Hypothesis 11: There is a significant difference between the levels of formal education of farmers, with regard to the use of the identified sources of information for new agricultural practices by fruit and vegetable farmers of Southwest Michigan.

Hypothesis 12: There is a significant difference between the levels of formal education of farmers, with regard to the use of the identified channels of information for new agricultural practices by fruit and vegetable farmers of Southwest Michigan.

Hypothesis 13: There is a significant difference between the types of farm ownership, with regard to the use of identified sources of information by fruit and vegetable farmers of Southwest Michigan, for new agricultural practices.

Hypothesis 14: There is a significant difference between the types of farm ownership with regard to the use of the identified channels of information by fruit and vegetable farmers of Southwest Michigan, for new agricultural practices.

Hypothesis 15: There is a significant difference between gross farm income, with regard to the use of the identified sources of information by fruit and vegetable farmers of Southwest Michigan, for new agricultural practices.

Hypothesis 16: There is a significant difference between gross farm income, with regard to the use of the identified channels by fruit and vegetable farmers of Southwest Michigan, for new agricultural practices.

Summary

A search of past literature was reviewed by the author. Over the past few decades researchers have written various dissertations and journal articles on sources and channels used by farmers to gain information on new agricultural practices. Sources and channels used by farmers depended on various personal and farm characteristics. Sixteen hypotheses were formulated from the objectives in Chapter I and the literature review of Chapter II.

CHAPTER III

METHODS AND PROCEDURES

The primary purpose of this study was to determine and examine what sources and channels fruit and vegetable growers of Southwest Michigan used in gaining information on new agricultural practices. Other questions would determine if size, gross dollar earnings, the amount of time farmers worked off the farm, age of the farmer, amount of formal education and the number of years the person had been in farming, had an effect on the use of sources or channels.

This chapter includes a description of the sample population, development of an instrument, procedures used for data collection and a discussion of validity and reliability. The response rate, data analysis types and procedures used are outlined for each process.

The study was a survey research effort. Data was collected by mail through a questionnaire, and information was analyzed and described using a computer software program, SPSS PC+. The questionnaire mailed to the sample population, along with a cover letter and postcard, was reviewed by the University Committee on Research Involving Human Subjects.

Population and Sample

The population of this study included farmers from Southwest Michigan who were on the Michigan State University Cooperative Extension Service office mailing list and were identified as having requested fruit and vegetable information at least once. They come from the counties of Allegan, Berrien, Cass, Kalamazoo and Van Buren. To control internal validity, the researcher asked individual counties to send the entire list. The researcher then purged the lists of non farmer names, prior to random sampling. From the five counties, using the microcomputer software SPSS PC+, a sample of 275 farmers were randomly drawn from 970 names.

Census figures for the five counties in Southwest Michigan indicated that there were a total of 2010 fruit and vegetable growers. Of these 1,446 were fruit growers (Michigan Orchard Survey, 1986) and 564 were vegetable growers (Michigan Commercial Vegetable Survey 1987). Seventy-five percent of farms in Southwest Michigan may have produced both fruits and vegetables.

The population of 970 fruit and vegetable growers on the mailing list of the five counties of Allegan, Berrien, Cass, Kalamazoo and Van Buren represented 61% of the fruit and vegetable farm population.

Development of Instrument

The mail questionnaire was designed after specific research questions were developed when considering the objectives of the study. The instrument was divided into two parts (Appendix A). Part I asked farmers to identify their use of sources on a 5 point scale: 4 = Always Use, 3 = Usually Use, 2 = Sometimes Use, 1 = Seldom Use

and 0=Never Use. The rating scale of 4=Always Use, 3=Usually Use, 2=Sometimes Use, 1=Seldom Use and 0=Never Use was repeated for question 2 for selected channels in Part I of the Survey. Questions in Part II of the survey asked for background information on their farm, and personal characteristics. Farm background and personal characteristics included number of acres owned and rented, number of days the farmer may have worked off the farm, current age of the farmer, extent of formal education, number of years in farming, gender, type of farm ownership and gross dollar earnings from the farming operation.

A cover letter was written describing the importance of the survey and giving instructions on the completion of the survey (Appendix B). A postcard was also included with the questionnaire and cover letter (Appendix C). The cover letter instructed the farmers to fill out the entire questionnaire and to return the questionnaire and postcard together. This process is used by the United States Census of Agriculture to maintain confidentiality of respondents. By checking the list of individuals who had returned postcards, against the initial list of 275 farmers, the researcher was able to send a second questionnaire, cover letter (Appendix D) and postcard for them to complete and return as before. A third postcard was sent to non-respondents. This postcard explained the importance of their response, to the project (Appendix E). Surveys and postcards returned were recorded daily (Appendix F).

Validity and Reliability

A jury of four experts were selected to establish validity of the instrument. Jury members were a district horticulture agent, a fruit and vegetable specialist, an experiment

station coordinator and an agriculture education professor. They were selected on the basis of academic background, knowledge of fruit and vegetable farmers and a understanding of how farmers learn about new agricultural practices. A copy of the instrument was delivered to each judge and the researcher scheduled a meeting with each member to evaluate the instrument. Jury members were asked to evaluate each question of the instrument to determine if it could be understood, and would appropriately answer the research questions.

After meeting with the judges and reviewing their concerns, the question about the amount of gross dollars earned on the farm was changed. It was moved to the end of the survey. Members felt that some respondents would be uninclined to answer the question and this would discourage them early in completing the instrument. The experts provided assistance in addressing all three types of validity concerns, content-construct, and face validity.

Reliability of the instrument was achieved through a number of techniques. Randomness of selection of the sample population was used. Reliability was also increased through selecting a large sample from the population and receiving a high percentage of responses from this sample population. A reliability coefficient, Cronbach's Alpha, was completed by using SPSS PC+. An alpha coefficient of .72 "sources of information," and .86 for "channels of information" was computed. Reliability has been defined in Educational Research an Introduction by Borg and Gall (1983). "The reliability of standardized tests is usually expressed as a reliability coefficient that varies between values of .00 and 1.00, with 1.00 indicating perfect reliability, which is never attained in practice, and .00 indicating no reliability. The

more closely a reliability coefficient is to the value of 1.00, the more the test is free of error variance and is a measure of the true differences among persons in the dimension assessed by the test" (Borg and Gall, 1983, p. 283). Alpha coefficients of .72 and .86 shows that the questions of the survey instrument were reliable.

Copies of the instrument, cover letter and postcards were submitted to the University Committee on Research Involving Human Subjects. The committee approved the instrument and cover letters as submitted. The author then proceeded with the distribution of the survey instrument and process of data collection.

Distribution and Data Collection

After the computer selected 275 names, they were placed on a word processing file to be merged with a cover letter. Each cover letter and follow up postcard included the name of the potential respondent and an appropriate salutation. This allowed for personalization of cover letters, postcards and envelopes. All letters, surveys, and postcards were printed on a laser printer which ensured letter quality printing. An individual identification number was written on each of the postcards. This number was the same as the one assigned to each name on the mailing list.

The cover letter assured respondents that their responses would be kept confidential. It was printed on Cooperative Extension Service letterhead and co-signed by the researcher and district horticulture agent, T. Mike Thomas. The survey consisted of four printed pages compiled in magazine type 8 1/2" by 11" pages, then organized in a fashion that made sure that none of the four pages would get separated. This made reading easy by the respondents.

The entire package was mailed using first class postage with a return self addressed and postage paid return envelope provided by the researcher, along with the self addressed, postage paid postcard. The survey and postcard were to be returned together to the researcher. This process allowed the researcher to determine who had completed the survey, and keep the confidentiality of respondents.

The survey, cover letter and return postcard with its identifying number, was mailed on Thursday, June 14, 1990. The author requested that the survey be completed and returned with in three days. This allowed respondents Friday, Saturday and Sunday to review their questionnaire, make appropriate selections, and return the survey. On the following Monday and Tuesday, 90 surveys were returned. At the end of the week the number of surveys received per day dropped off, along with postcard responses. As surveys and postcards were returned and received in the Extension office, both were stamped with the date, and their numbers were recorded. Individual's names were checked off as having returned their questionnaire.

After a three week period, a second cover letter, a second survey identical to the first, and postcard were sent on Thursday, July 5, 1990. A different colored pen was used to write the assigned number on the second postcard, to determine the different respondent periods. These individuals were given a two week period to respond. After two weeks, individuals who had not returned postcards were sent a third mailing on July 19, 1990. This was a postcard reminding them of the importance of the survey and requesting that they fill out one of the first prior surveys, and send them in immediately. The cut off date for the last survey was July 30. Of the 275 surveys mailed, 210 were returned, 190 (69%) were useable, 20 were unsatisfactory for use, or were blank.

Reasons people did not fill out the survey are in Appendix G.

Sixteen names were randomly selected from the list of 65 non-respondents. These individuals were telephoned and only questions regarding selected background information of part two of the survey instrument, were asked. This data was analyzed to determine the differences between the sample population of farmers who returned their surveys and the sample population of farmers, who had not returned their surveys (Appendix H). The results of the telephone survey showed that their personal and farming characteristics were the same as the people who had returned the survey. However, the non-respondents were not asked to rate the selected sources of channels.

After receiving the 190 questionnaires, information on them was typed into the microcomputer software package SPSS PC+ for data analysis. The alpha level was set in all cases at .05 level of significance, to achieve a 95% confidence level. The following statistical procedures were used to analyze the data. The first program selected the frequencies of variables for descriptive statistics. Frequency counts, percents, valid percents, and accumulative percents were determined for sources and channels of information. Frequencies and comparisons were calculated with part two of the survey, for questions regarding number of days worked off the farm, level of education, gender of respondent, type of farm ownership and gross dollar earnings from the farm over the past five years. Also completed were means, standard deviations and range, on Part II of the survey for age of the farmer, number of years in farming, number of acres owned, number of acres rented and farm size in acres.

Correlations were used to test the null hypotheses of independent variables, of age of the farmer, number of years in farming and the size of the farm. Statistical t-tests

were performed on independent variables of the null hypotheses, stating differences of gender and full-time versus part-time farmers, between any two group mean scores. One-way Analysis of Variance (ANOVA) tests were used to test significant differences of the null hypotheses determining sources and channels of information used, with more than two means of independent variables, between types of formal education, types of farm ownership and gross farm income. Scheffee or Tukey procedures as a post hoc multiple comparison analysis were preformed at a .05 level of significance, with an accompanying 95% confidence level for each F-Probability.

Summary

This chapter has outlined the methods and procedures used to implement the study. A sample of 275 names was drawn from 970 fruit and vegetable growers in Southwest Michigan on the Cooperative Extension Service mailing list in July of 1990. The total return rate of the survey instrument was, 190 surveys usable, 20 surveys not usable or blank. This is a 69% usable rate of the 275 farmers selected randomly by the computer software SPSS PC+. Procedures used to statistically analyze data included frequencies, percentages, means, standard deviations, correlations, t-test and ANOVAs. Post hock comparisons were performed using Scheffee and Tukey tests at a 95% confidence level.

CHAPTER IV

STUDY FINDINGS

The purpose of the study was to determine the use of sources and channels by fruit and vegetable farmers in five counties of southwest Michigan to gain information on new agriculture practices. Also, to determine if selected personal and demographic characteristics have an effect on sources or channels of information farmers used to gain this information. This chapter will describe the respondents of the survey statistically, with tables and narratives, frequency of use of sources and channels selected by the respondents and ranking of sources and channels. Null hypotheses were tested of respondents' personal characteristics and the use of sources and channels of agricultural information and the variables of 1) age, 2) number of years in farming, 3) farm size, 4) gender, 5) time spent on or off the farm, 6) type of formal education 7) type of farm ownership and 8) gross farm income. In addition a summary of the study findings was presented.

As reported in Chapter III, 190 useable questionnaires were returned of 275 questionnaires mailed to farmers in five Southwest Michigan counties. This represented a 69% return rate.

Description of Respondents

The respondents of the survey were fruit and vegetable farmers of five counties, Allegan, Berrien, Cass, Kalamazoo and Van Buren, in Southwest Michigan. Selected characteristics of a personal nature and also of their farms are displayed in Tables 1. through 6. Of survey respondents 177 (94.7%) were male and 10 (5.3%) were female. (See Table 1 and Figure 1) These percentages were identical to those reported in the 1987 Census of Agriculture for the United States, for these types of farms.

Table 1. Number and Percent of Male and Female Fruit and Vegetable Farmers

Characteristics	Fruit and Vegetable Farmers Number	Percent
Male	177	94.7
Female	10	5.3
Total	187	100

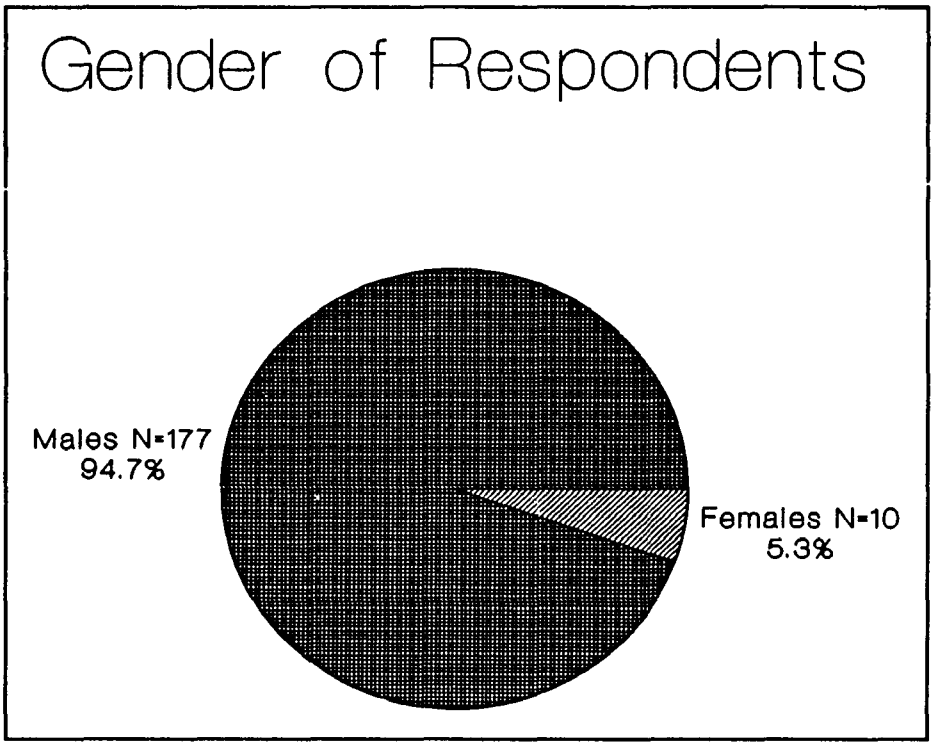

Figure of 1. Gender of Respondents

As reported in Table 2 and Figure 2, 21 (11.2%) of the farmers had less than a high school diploma, 95 (50.8%) had a high school diploma, 26 (13.9%) had a two year degree and 45 (24.1% had a four year degree or more.

Table 2. Number and Percent of Fruit and Vegetable Farmers by Four Educational Levels

Characteristics	Fruit and Vegetable Farmers Number	Percent
Less than High School	21	11.2
High School	95	50.8
Two Year Degree	26	13.9
Four Year Degree or more	45	24.1
Total	187	100

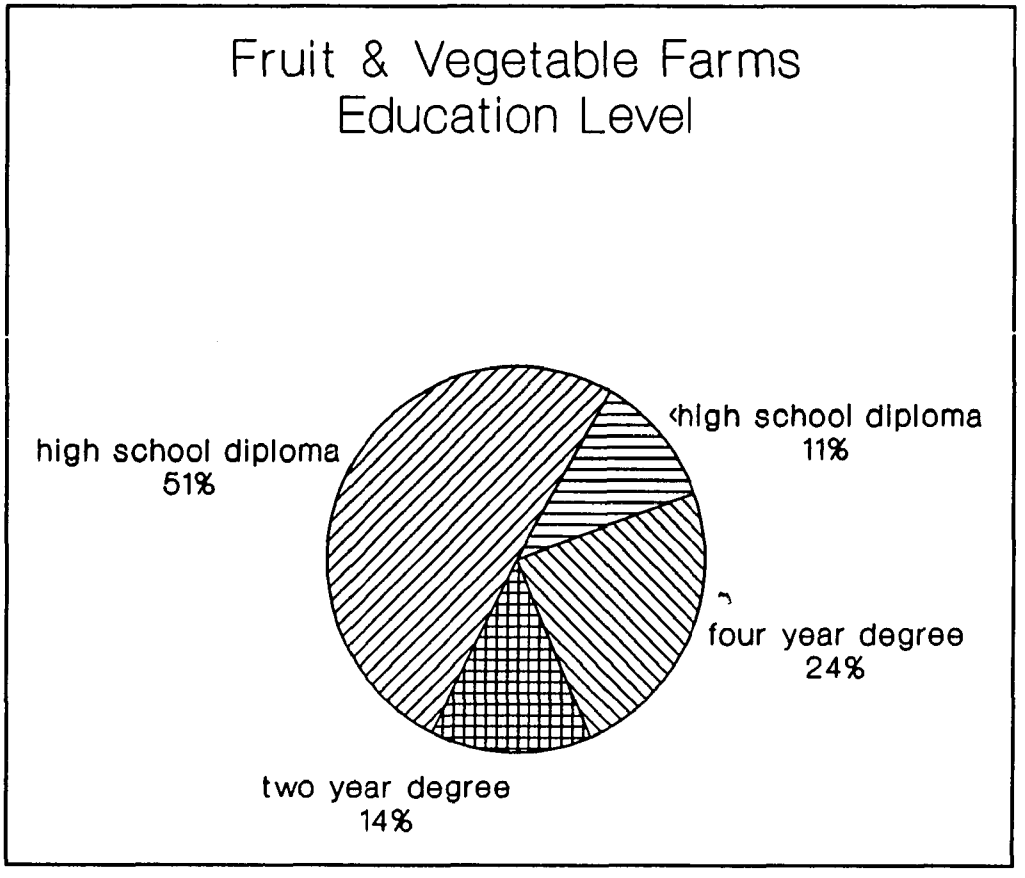

Figure 2. Educational Levels of Sample Population

The number of owner operators, shown in Table 3 and Figure 3, was 146 (78.9%); 25 (13.5%) farms were partnerships and 14 (7.6%) farm corporations. These number were very close to what was reported in the Census of Agriculture of the United States for 1987.

Table 3. Number and Percent of Fruit and Vegetable Farmers by Type of Farm Ownership

Characteristics	Fruit and Vegetable Farmers	
	Number	Percent
Owner operation	146	78.9
Partnership	25	13.5
Corporation	14	7.6
Total	185	100

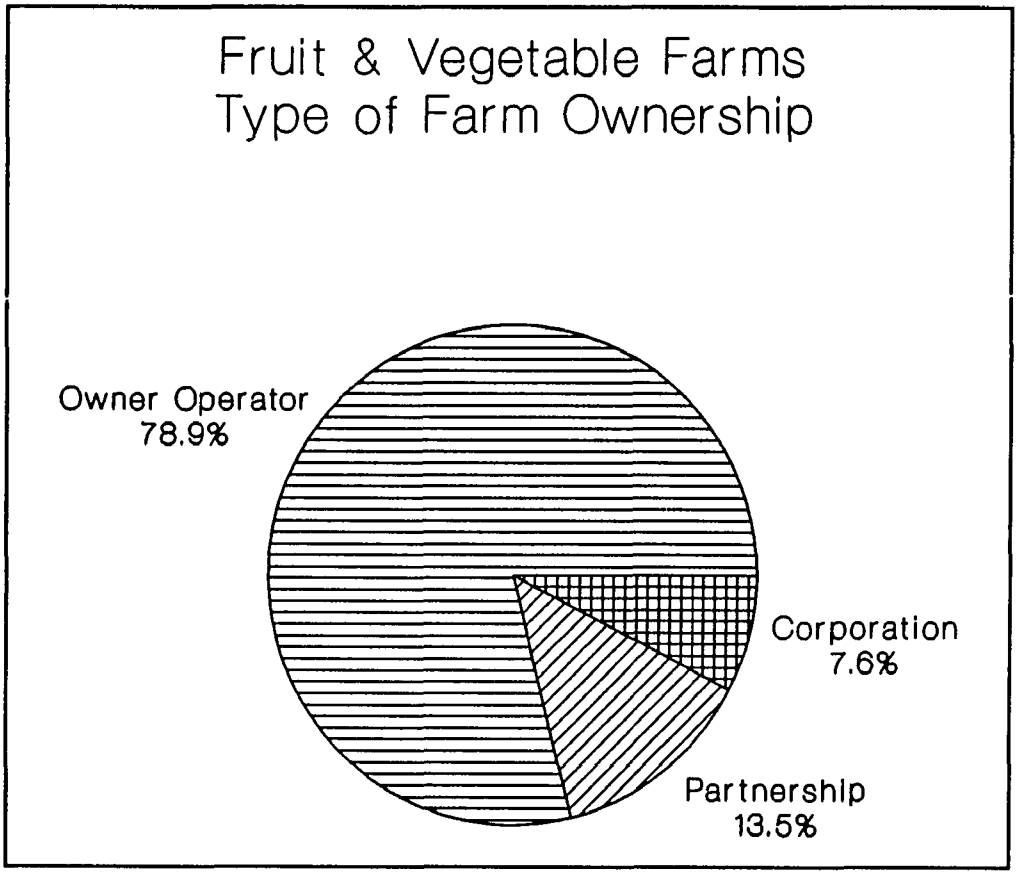

Figure 3. Type of Farm Ownership of Sample Population

The survey results showed 128 full-time farmers (69.99%) and 55 (30.19%) part-time farmers which are reported in Table 4 and Figure 4. These findings were different from state averages which show almost an even 50/50 distribution in full-time and part-time farming (Michigan Agricultural Statistics 1987).

Table 4. Number and Percent of Fruit and Vegetable Farmers Farming Full-Time and Part-Time

Characteristics	Fruit and Vegetable Farmers Number	Percent
Part-Time	55	30.1
Full-Time	128	69.9
Total	183	100

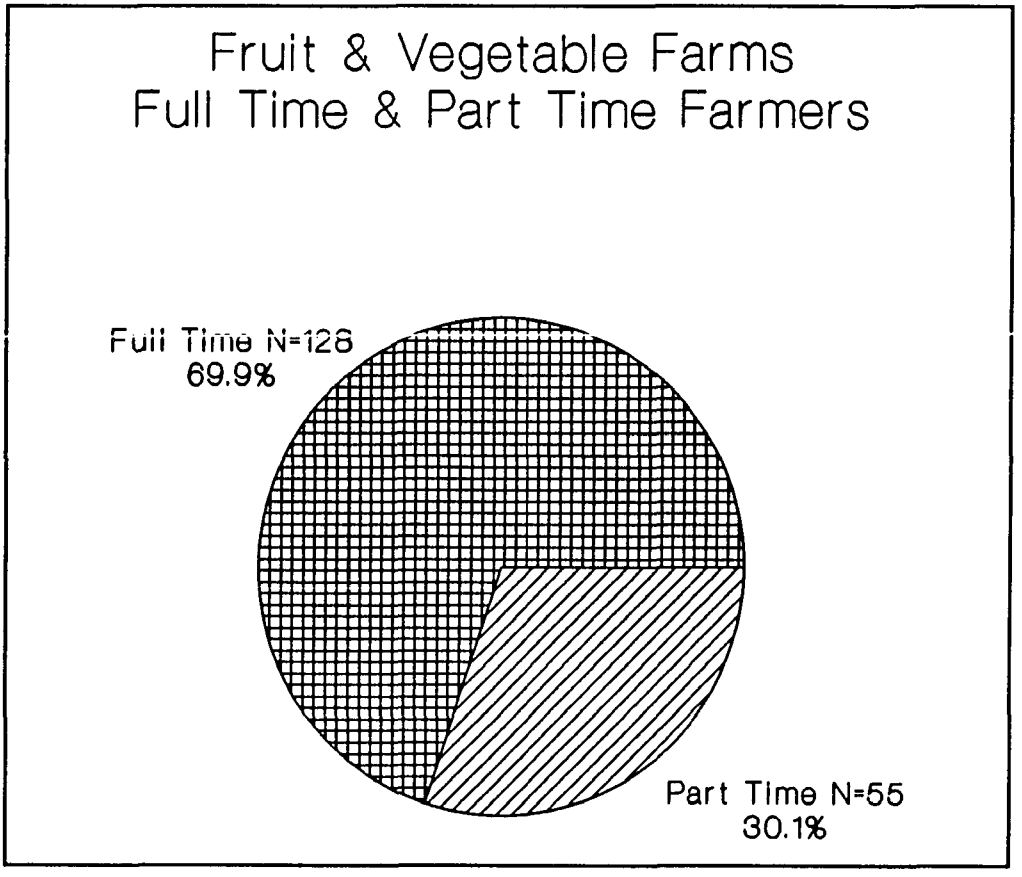

Figure 4. Full-Time and Part-Time Farmers

When grouping the sample population by income, the responses showed an even distribution among the income groups. Analysis of the income groups are revealed in Table 5 and Figure 5, revealed that 34 farmers (19.54%) had incomes less than $5,000, 19 farmers (10.92%) had incomes of $5,001 to $10,000, 32 farmers (18.39%) had incomes of $10,001 to $25,000, 21 farmers (12.07%) had incomes of $25,001 to $50,000, 26 farmers (14.94%) had incomes of $50,001 to $100,000, 24 farmers (13.79%) had incomes of $100,001 to $250,000 and 18 farmers (10.35%) had incomes over $250,000.

The typical farmer in this study can be described as 1) male, 2) works on his own operation, 3) has a minimum of a high school diploma or better, and 4) was a full-time farmer.

Table 5. Number and Percent of Fruit and Vegetable Farmers in Seven Income Groups

Characteristics	Fruit and Vegetable Farmers Number	Percent
Income Group		
less than $5,000	34	19.54
$5,001 to $10,000	19	10.92
$10,001 to $25,000	32	18.39
$25,001 to $50,000	21	12.07
$50,001 to $100,000	26	14.94
$100,001 to $250,000	24	13.79
greater then $250,000	18	10.35
Total	174	100.00

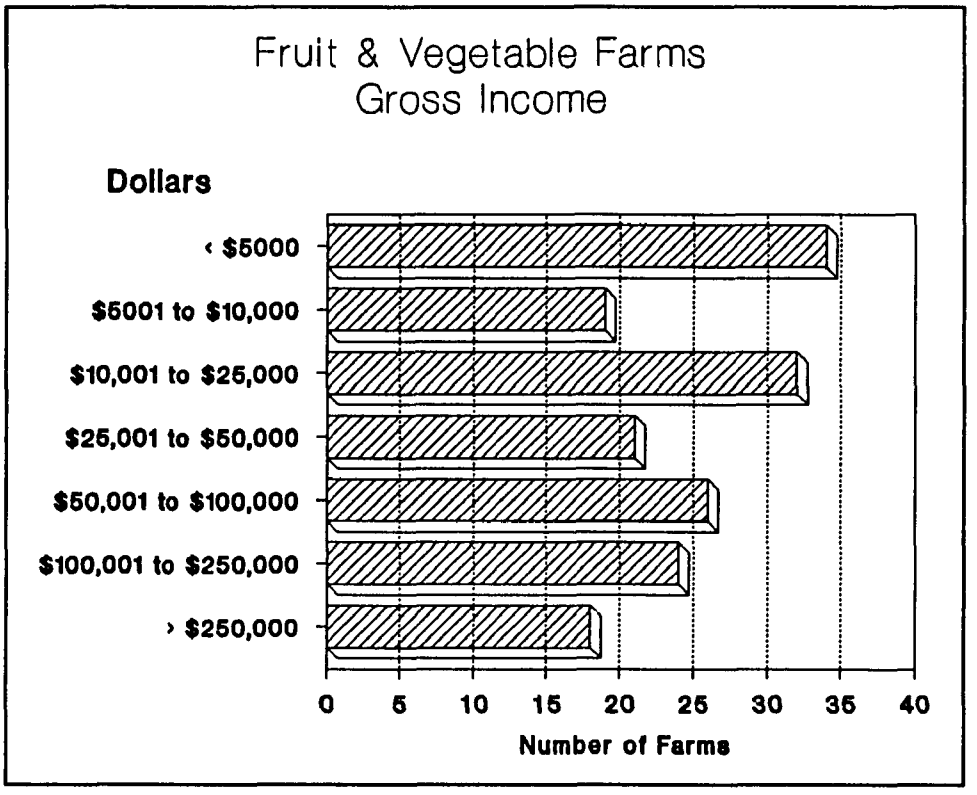

Figure 5. Gross Income Characteristics of Sample Population

The data in Table 6 showed the average age of the 188 farmers as 54 years old (S.D. 14.59) with a range from 25 to 80 years of age. Michigan statistics shows the average farmer age at 52 years (Michigan Statistical Analysis 1987). The 181 individuals who responded, had been in farming 29 years (S.D. 14.38), with a minimum of 1 year to a maximum of 60 years. This was higher than the national average of 18 years, found by the Census of Agriculture United States 1987. The average size of 179 farms were 198 acres (S.D. 76.39), with a minimum of 1 acre to a maximum of 14,000 acres. This was very close to the Michigan average of 202 acres per farm reported in the Census of Agriculture United States 1987. The average number of acres owned by the 176 farmers reporting was 177.2 acres (S.D. 762.32) with a minimum of 0 acres and a maximum of 14,000 acres. Eighty-six of the respondents rented an average of 71.97 acres (S.D. 233.63). The range of rental land was from 0 acres to as many as 2,000 acres.

Table 6. Selected Personal and Farm Characteristics of Farmers

Characteristics	Number	Mean	S.D.	MIN	MAX
Age	188	54.17	14.59	25	80
Years in Farming	181	28.97	14.38	1	60
Size of Farm	179	197.65	763.39	1	14,000
Acres Owned	176	177.20	762.32	0	14,000
Acres Rented	86	71.97	233.63	0	2,000

Overall, characteristics of the sample population answering the questionnaire were very close to the characteristics of populations of the 1987 Census of Agriculture of the United States and the Michigan Statistical Analysis of 1987.

Research Question 1: What was the frequency of use of selected sources and selected channels of information, by fruit and vegetable farmers selected from five counties in Southwest Michigan, to gain information on new agricultural practices?

Frequency of Use by Respondents

The first objective was to determine the use of twelve selected sources by farmers to gain information on new agricultural practices. The survey population was asked to rate how frequently they used twelve sources, on a 5 point scale. The categories were 4 = Always Use, 3 = Usually Use, 2 = Sometimes Use, 1 = Seldom Use and 0 = Never Use. The frequencies and percentages are listed in Table 7.

The researcher grouped the sources according to categories. He combined the scores of the responses in the categories of Always Use and Usually Use, to determine the number of farmers who used a specific source of information. The data displayed in Table 7 showed that 77 farmers (41.6%), used Cooperative Extension Service personnel, 65 farmers (35.7%) used Product Company Representatives, 61 Farmers (33.7%) used Farmers who were family members, and 52 farmers (28.2%) used Farmers who were not family members. Vocational Agriculture Teachers were used by

Table 7 - Frequencies of Sources of Information Used by Fruit and Vegetable Farmers

Sources of Information	4 = Always Use Frequency (Percent)		3 = Usually Use Frequency (Percent)		Combined 4 and 3 (Percent)	2 = Sometimes Use Frequency (Percent)		1 = Seldom Use Frequency (Percent)		0 = Never Use Frequency (Percent)		Combined 1 and 2 (Percent)
Agricultural Stabilization Conservation Service	17	(9.3%)	26	(14.2%)	43 (23.5%)	55	(30.1%)	51	(27.9%)	34	(18.5%)	85 (46.4%)
County Cooperative Extension Service	23	(12.4%)	54	(29.2%)	77 (41.6%)	74	(40.0%)	21	(11.4%)	13	(7.0%)	34 (18.4%)
Farmers Home Administration	1	(.6%)	8	(4.6%)	9 (5.2%)	13	(7.4%)	40	(22.9%)	113	(64.5%)	153 (18.4%)
Farmers who are family members	22	(12.2%)	39	(21.5%)	61 (33.7%)	52	(28.7%)	24	(13.3%)	44	(24.3%)	68 (37.6%)
Farmers who are not family members	10	(5.4%)	42	(22.8%)	52 (28.2%)	70	(38.0%)	32	(17.4%)	30	(16.4%)	62 (33.8%)
Local Sales people	4	(2.2%)	40	(22.3%)	44 (24.5%)	75	(41.9%)	32	(17.9%)	28	(15.7%)	60 (33.6%)
Michigan State University Specialist	9	(5.0%)	31	(17.1%)	40 (22.1%)	65	(35.9%)	37	(20.4%)	39	(21.6%)	76 (42.0%)
Private Consultants	18	(10.1%)	21	(11.7%)	39 (21.8%)	25	(14.0%)	27	(15.1%)	88	(49.1%)	115 (64.2%)
Product Company Representatives	22	(12.1%)	43	(23.6%)	65 (35.7%)	69	(37.9%)	25	(13.7%)	23	(12.7%)	58 (26.4%)
Soil Conservation Service	5	(2.7%)	20	(11.0%)	25 (13.7%)	55	(30.2%)	46	(25.3%)	56	(30.8%)	102 (56.1%)
Vocational Agriculture Teacher	**		1	(.5%)	1 (.5%)	7	(3.7%)	23	(12.8%)	149	(83.0%)	172 (95.8%)
Other Sources	4	(2.9%)	4	(2.9%)	8 (5.8%)	37	(26.6%)	19	(13.7%)	75	(54.0%)	94 (67.6%)

Respondents were asked how frequently they used sources on a 5 point scale (4 Always Use . . . . . 0 never use)

**None Reported

1 farmer (.5%), 8 farmers (5.8%) used Other Sources and 25 farmers (13.7%) used Soil Conservation Service personnel and placed on the Seldom Use or Never Use end of the scale.

The ranked, means and standard deviations in Table 8 of the sources of information, revealed similar results. Farmers sources of information, ranked means and standard deviations were Cooperative Extension Service Personnel, (2.29, 1.05) first and second Product Company Representatives (2.09, 1.17). Those sources of information with a ranked means and standard deviations of Farmers who are family members (1.84, 1.34) and Farmers who are not family members (1.84, 1.12) tied for third, fourth, Local Sales People (1.78, 1.04), fifth Agricultural Stabilization Conservation Service (ASCS) Personnel (1.68, 1.20), sixth Michigan State University Specialist (1.64, 1.14), seventh Soil Conservation Service (SCS) Personnel (1.30, 1.10) and eighth Private Consultants (1.18, 1.41). Sources of information of ranked means and standard deviations were Other Sources (.87, 1.08) ninth, Farmers Home Administration (FmHA) personnel (.54, .86) tenth and Vocational Agricultural Teachers (.22, .53) eleventh. These results were consistent with past studies (Stallings and Harrison, 1980), mentioned in Chapter II.

Table 8. Ranked Means of Sources of Information Use by Fruit and Vegetable Farmers

Sources of Information	Rank	Mean	Std. Dev.
County Cooperative Extension Service	1	2.29	1.05
Product Company Representatives	2	2.09	1.17
Farmers who are family members	3	1.84	1.34
Farmers who are not family members	3	1.84	1.12
Local Sales people	5	1.78	1.04
Agricultural Stabilization Conservation Service	6	1.68	1.20
Michigan State University Specialist	7	1.64	1.14
Soil Conservation Service	8	1.30	1.10
Private Consultants	9	1.18	1.41
Other Sources	10	.87	1.08
Farmers Home Administration	11	.54	.86
Vocational Agriculture Teacher	12	.22	.53

The second part of Research question one asked how frequently selected channels were used by fruit and vegetables farmers for information on new agricultural practices. Farmers were given 18 choices of categories for channels. The data in Table 9 shows the frequencies and percentages of use of channels of information by the 190 farmers who completed the survey. The data in Table 9 shows selected channels having high percentages in the categories of Always Use or Usually Use, the researcher combined the categories. The combined data revealed 104 (56%) farmers selected farm magazines as the most used channel of information. Agricultural bulletins from Michigan State University and other universities were second; 93 farmers (50%) selected the top two categories. Weekly or Monthly Agricultural Newsletters were used by 88 farmers (49%). Word of mouth from other farmers as a channel of information was chosen by 75 farmers (41%) of these combined categories.

Those at the opposite end of the rating scale with large percentages in the Seldom Use and Never Use categories were led by Video Tape reported by 160 farmers (90%).

One hundred and fifty-nine farmers (87%) selected Seldom Use and Never Use for the channel of Microcomputer Communications and 93 farmers (51%) selected Seldom Use and Never Use for the channel of Field Days and Twilight Tours.

Table 9. Frequencies of Channels of Information Used by Fruit and Vegetable Farmers

Channels of Information	4 = Always Use Frequency (Percent)		3 = Usually Use Frequency (Percent)		Combined 4 and 3 (Percent)	2 = Sometimes Use Frequency (Percent)		1 = Seldom Use Frequency (Percent)		0 = Never Use Frequency (Percent)		Combined 1 and 2 (Percent)
Agricultural bulletins from MSU and other universities	23	(12.5%)	70	(38.0%)	93 (50.5%)	69	(37.6%)	17	(9.2%)	5	(2.7%)	22 (11.9%)
Agricultural Newsletters	10	(5.5%)	40	(22.1%)	50 (27.6%)	56	(30.9%)	41	(22.7%)	34	(18.8%)	75 (41.5%)
Agricultural Trade Shows	20	(11.2%)	41	(22.9%)	61 (34.1%)	55	(30.7%)	27	(15.1%)	36	(20.1%)	33 (35.2%)
Daily Newspapers	27	(14.6%)	46	(24.9%)	73 (39.5%)	54	(29.2%)	42	(22.7%)	16	(8.6%)	58 (31.6%)
Demonstration plots on trials on farms	4	(2.2%)	21	(11.5%)	25 (13.7%)	72	(39.6%)	49	(26.9%)	36	(19.8%)	85 (46.7%)
Direct Mailings	20	(11.0%)	48	(26.4%)	68 (37.4%)	67	(36.8%)	24	(13.2%)	23	(12.6%)	47 (25.8%)
Farm Magazines	42	(22.7%)	62	(33.5%)	104 (56.2%)	54	(29.2%)	12	(6.5%)	15	(8.1%)	27 (14.6%)
Field Days and Twilight Tours	3	(1.7%)	14	(7.7%)	17 (9.4%)	71	(39.2%)	46	(25.4%)	47	(26.0%)	93 (51.4%)
Microcomputers	3	(1.7%)	5	(2.8%)	8 (4.5%)	14	(7.7%)	31	(17.1%)	128	(70.7%)	159 (87.8%)
Office visits to ASCS, CES, FmHA, SCS	11	(6.1%)	29	(16.0%)	40 (22.1%)	63	(34.8%)	48	(26.5%)	30	(16.6%)	78 (43.1%)
Radio Advertisements and programs	12	(6.5%)	19	(10.3%)	31 (16.8%)	62	(33.7%)	45	(24.3%)	46	(25.2%)	91 (49.5%)
Television Advertisements and programs	5	(2.7%)	5	(2.7%)	10 (5.4%)	50	(27.2%)	59	(32.1%)	65	(35.3%)	124 (67.4%)
Telephone recordings	8	(4.5%)	20	(11.2%)	28 (15.7%)	34	(19.1%)	30	(16.9%)	86	(48.3%)	116 (65.2%)
Using the telephone to contact ASCS, CES, FmHA, SCS	24	(13.1%)	45	(24.6%)	69 (37.7%)	51	(27.9%)	32	(17.5%)	31	(16.9%)	63 (34.4%)
Video Tapes	1	(.6%)	5	(2.8%)	6 (3.4%)	12	(6.7%)	47	(26.4%)	113	(63.5%)	160 (89.9%)
Weekly or monthly ag newsletters	39	(21.5%)	49	(27.1%)	88 (48.6%)	55	(30.4%)	16	(8.8%)	22	(12.2%)	38 (21.0%)
Word of mouth from other farmers	21	(11.5%)	54	(29.5%)	75 (41.0%)	85	(46.5%)	16	(8.7%)	7	(3.8%)	23 (12.5%)
Other	3	(2.5%)	8	(6.6%)	11 (9.1%)	37	(30.6%)	26	(21.5%)	47	(38.8%)	73 (60.3%)

*Respondents were asked how frequently they used on a 5 point scale (4 Always Use . . . . . 0 never use)

The channels of information were ranked using means computed from the farmer responses. The data in Table 10 shows the ranking, means, and standard deviations.

The ranking of each channel's means and standard deviations revealed those at the top, were Farm Magazines (2.56, 1.15) first, Agricultural Bulletins from Michigan State University and other universities second, Weekly or Monthly agriculture newsletters (2.37, 1.26) came third, Word of mouth from other farmers (2.26, .93) fourth, Daily Newspapers (2.14, 1.18) fifth and Direct Mailings (2.10, 1.16) sixth. Channels with a mean and standard deviation of Using the telephone to contact ASCS, CES, FmHA and SCS and Agricultural Trade Shows (1.90, 1.28) tied for seventh, Agricultural Newsletters (1.73, 1.16) ninth, Office visits to ASCS, CES, FmHA and SCS (1.69, 1.11) tenth. Tied for eleventh in the ranking, were Demonstration plots for trials on farms (1.49, 1.01) and Radio advertisements and programs (1.49, 1.16). Field Days and Twilight Tours (1.34, 1.00) ranked thirteenth, Other Channels (1.12, 1.08) ranked fourteenth, Telephone recordings (1.07, 1.24) ranked fifteenth and Television Advertisements and programs (1.05, .99) ranked sixteenth. Those with ranked means and standard deviations at the bottom of the categories were Video Tape (.51, .79) at seventeenth and Microcomputer Communications (.48, .88) at eighteenth.

Farm Magazines, Agricultural bulletins and Weekly and monthly agricultural newsletters have been used by farmers for many years. Literature shows Farm Magazines ranking first in many of the past surveys (Agricultural Communications Research Report -14, 1963). Sources and channels of information categorized as Other were given by respondents and are displayed in Appendix H.

Table 10. Ranked Means of Channels of Information Used by Fruit and Vegetable Farmers

Channels of Information	Rank	Mean	Std. Dev.
Farm Magazines	1	2.56	1.15
Agricultural Bulletins	2	2.48	.92
Weekly or monthly Ag Newsletters	3	2.37	1.26
Word of Mouth from other farmers	4	2.36	.93
Daily Newspapers	5	2.14	1.18
Direct Mailings	6	2.10	1.16
Using the telephone to contact ASCS, CES, FmHA, and SCS	7	1.99	1.28
Agricultural Trade Shows	7	1.99	1.28
Agriculture Newsletters	9	1.73	1.16
Office visits to ASCS, CES, FmHA, SCS	10	1.69	1.11
Demonstration plots or trials on farms	11	1.49	1.01
Radio Advertisements and programs	11	1.49	1.16
Field Days and Twilight Tours	13	1.34	1.00
Others Channels	14	1.12	1.08
Telephone Recordings	15	1.07	1.24
Television Advertisements and programs	16	1.05	.99
Video Tape	17	.51	.79
Microcomputer Communications	18	.48	.88

Testing of Null Hypotheses Using Correlations

The hypotheses reported in Chapter II were investigated. All of the hypotheses were converted to null hypotheses for statistical analysis. Null hypotheses were tested based on use of identified sources and channels of information and by the fruit and vegetable farmers and selected characteristics. The five point rating scale for testing was:

4 = Always Use
3 = Usually Use
2 = Sometimes Use
1 = Seldom Use
0 = Never Use

A significant P-value was set at .05 to obtain a confidence level of 95%.

Null Hypothesis 1: There is no significant relationship between the age of the farmer and the identified sources of information, used by fruit and vegetable farmers of Southwest Michigan, for new agricultural practices.

Analysis of the items used to test the hypotheses 1-6 are displayed as correlations in Table 11. Data revealed that younger farmers used the sources of information of (1) Farmers who are family members, (corr = -.22, n=180, p=.002), (2) Farmers who are not family members (corr=-.27, n=183, p=.00), (3) Local Sales People (corr=.32, n=177, p=.00), (4) Private Consultants (corr=-.19, n=178, p=.009) and (5) Other Sources (corr=-.24, n=138, p=.004). These were significantly more than sources used by older farmers.

Since significant differences were found relationships between the age of the farmer in years and the identified sources of information the researcher rejected the null hypothesis. The alternate hypothesis which stated that there is significant relationships between the age of the farmer and the identified sources of information used by fruit and vegetable farmers of Southwest Michigan for new agricultural practices was accepted.

Null Hypothesis 2: There is no significant relationship between the age of the farmer and the identified channels of information used by fruit and vegetable farmers of Southwest Michigan, for new agricultural practices.

Data shown in Table 12 revealed that older farmers used the following channels of information significantly more than younger farmers (1) Agricultural Bulletins (corr=.21, n-183, p=.003), (2) Daily Newspapers (corr=.20, n-184, p=.006), and (3) Direct Mailings (corr=.17, n=181, p=.018).

Younger farmers used the following channels of information significantly more than their older counterparts: (1) Agricultural Trade Shows (corr=-.23, n=178, p=.002), (2) Microcomputer Communications (corr=.17, n=180, p=.01), (3) Using

Table 11. Correlation Between Sources of Information and Selected Characteristics of Respondents

Sources of Information	AGE Correlation (Number) P=value	EXPERIENCE Correlation (Number) P=value	FARM SIZE Correlation (Number) P=value
Agricultural Stabilization Conservation Personnel	-.04 (182) P= .52	.03 (176) P= .61	.02 (174) P= .73
Cooperative Extension Service Personnel	.01 (184) P= .89	-.05 (178) P= .49	-.06 (176) P= .41
Farmers Home Administration	-.09 (174) P= .21	-.09 (170) P= .21	.04 (167) P= .52
Farmers who are family members	-.22 (180) P= .002*	-.03 (174) P= .63	.11 (172) P= .11
Farmers who are not family members	-.27 (183) P= .00*	-.29 (177) P= .00*	.02 (175) P= .70
Local Sales People	-.32 (177) P= .00*	-.21 (172) P= .005*	-.02 (169) P= .73
Michigan State University Specialist	-.04 (180) P= .56	.00 (174) P= .91	-.00 (172) P= .96
Private Consultants	-.19 (178) P= .009*	-.04 (172) P= .59	.21 (170) P= .004*
Product Company representatives	-.08 (181) P= .24	-.00 (175) P= .97	.08 (173) P= .28
Soil Conservation Service Personnel	.12 (181) P= .09	.15 (175) P= .04*	.01 (173) P= .79
Vocational Agriculture Teacher	-.06 (179) P= .36	-.01 (174) P= .82	-.04 (171) P= .55
Other Sources	-.24 (138) P= .004*	-.23 (133) P= .007*	.04 (130) P= .63

*P-value of less than .05 shows a correlation.

Table 12. Correlation Between Channels of Information and Selected Characteristics of Respondents

Channels of Information	AGE Correlation (Number) P=value	EXPERIENCE Correlation (Number) P=value	FARM SIZE Correlation (Number) P=value
Agricultural Bulletins	.21 (183) P= .003*	.11 (177) P= .12	.02 (176) P= .78
Agricultural Newsletter	-.01 (180) P= .85	-.04 (175) P= .58	.08 (172) P= .29
Agricultural Trade Shows	-.23 (178) P= .002*	-.11 (173) P= .11	.06 (170) P= .39
Daily Newspapers	.20 (184) P= .006*	.21 (178) P= .004*	-.00 (176) P= .96
Demonstration plots or trials on farms	-.07 (181) P= .31	-.00 (175) P= .97	.09 (173) P= .20
Direct Mailings	.17 (181) P= .01*	.14 (175) P= .06	.00 (173) P= .99
Farm Magazines	-.03 (184) P= .59	.02 (178) P= .79	.05 (176) P= .47
Field Day & Twilight Tours	-.05 (180) P= .44	.06 (175) P= .41	.03 (172) P= .66
Microcomputer Communications	-.17 (180) P= .01*	-.15 (175) P= .04*	.13 (172) P= .07
Office Visits	-.05 (180) P= .50	-.01 (174) P= .80	.00 (172) P= .92
Radio Advertisements and programs	.06 (182) P= .40	.06 (176) P= .41	-.00 (174) P= .95
Television advertisements and programs	.02 (182) P= .73	.02 (176) P= .74	.01 (174) P= .80
Telephone recordings	-.12 (177) P= .09	-.17 (172) P= .02*	.00 (169) P= .99
Using the Telephone to contact ASCS, CES,FmHA, SCS	-.14 (182) P= .04*	-.14 (176) P= .05	.05 (174) P= .47

Table 12 (cont'd)

Channels of Information	AGE Correlation (Number) P=value	EXPERIENCE Correlation (Number) P=value	FARM SIZE Correlation (Number) P=value
Video Tape	-.28 (177) P= .00*	-.22 (172) P= .003*	.10 (169) P= .16
Weekly or monthly Ag Newsletter	-.15 (180) P= .04*	-.03 (175) P= .60	.02 (172) P= .75
Word of mouth from other farmers	-.20 (182) P= .00*	-.10 (176) P= .16	.00 (174) P= .93
Other Channels	-.22 (121) P= .01*	-.16 (116) P= .07	.01 (115) P= .85

*P-value of less than .05 shows a correlation.

the telephone to contact ASCS, CES, FmHA and SCS personnel (corr=-.14, n=182, p=.04), (4) Video Tape (corr=-.28, n=177, p=.00), (5) Weekly or monthly agricultural newsletters (corr=-.15, n=180, p=.04), (6) Word of mouth from other farmers (corr=-.20, n=181, p=.00) and (7) Other Channels (corr=-.22, n=121, p=.01).

Because significantly different relationships were found between the age of the farmer in years and the identified channels of information used, the researcher rejected the null hypothesis. The alternate hypothesis which stated that there is a significant relationship between the age of the farmer and the identified channels of information used by fruit and vegetable farmers of Southwest Michigan for new agricultural practices was accepted.

Null Hypothesis 3: There is no significant relationship between the number of years in farming and the identified sources of information used by fruit and vegetable farmers of Southwest Michigan, for new agricultural practices.

Data shown in Table 11 revealed that Farmers with less years in farming used these sources of information: (1) Farmers who are not family members (corr=.29, n=177, p=.00), (2) Local Sales People (corr=-.21, n=172, p=.005) and (3) Other Sources (corr=-.23, n=133, p=.007), significantly more than farmers with more experience in farming.

Farmers with more years in farming used the sources of information of the Soil Conservation Service personnel (corr=.15, n=175, p=.04) significantly more, than farmers with less years in farming.

Because significant relationships were found between the number of years in

farming and the identified sources of information used by farmers, the researcher rejected the null hypothesis. The alternate hypothesis which stated that there is a significant relationship between the number of years in farming and the identified sources of information used by fruit and vegetable farmers of Southwest Michigan for new agricultural practices was accepted.

Null Hypothesis 4: There is no significant relationship between the number of years in farming and identified channels of information, used by fruit and vegetable farmers of Southwest Michigan, for new agricultural practices.

Data shown in Table 12 revealed that farmers with more years in farming used the channel of information of Daily Newspapers (corr=.21, n=178, p=.004) significantly more than farmers with fewer years in farming. Also farmers with fewer years in farming used the channels of information of (1) Microcomputers Communications (corr=-.15, n=175, p=.04), (2) Telephone Recordings (corr=-.17, n-172, p=.02) and (3) Video Tape (corr=-.22, n=172, p=.003) significantly more, than farmers with more years in farming.

Because significant relationships were found between the number of years in farming and the identified channels of information used by farmers, the researcher rejected the null hypothesis. The alternative hypothesis which stated that there is a significant relationship between the number of years in farming and the identified channels of information used, by fruit and vegetable farmers of Southwest Michigan for new agricultural practices, was accepted.

Null Hypothesis 5: There is no significant relationship between the size of the farming acres and identified sources of information, used by fruit and vegetable farmers of Southwest Michigan, for new agricultural practices.

Data shown in Table 11 revealed a significant relationship between the size of the farm in acres and the use of individual sources of information. The larger the farm in acres the more the farmer used Private Consultants (corr=.21, n=170, p=.004) as a significant source of information.

Because significant relationships were found between the size of the farm in acres and the identified sources used by farmers, the researcher rejected the null hypothesis. Table 11 shows numbers, P-values and correlations, between sources of information used by farmers, their age in number of years, and size of their farm in acres. The alternate hypothesis, which stated that there is a significant relationship between the size of the farm in acres and the selected sources of information used, by fruit and vegetable farmers of Southwest Michigan, for new agricultural practices, was accepted.

Null Hypothesis 6: There is no significant relationship between the size of the farm in acres and identified channels of information, used by fruit and vegetable farmers of Southwest Michigan, for new agricultural practices.

Data in Table 12 reveals correlations computed between the size of the farm in acres and the identified channels of information. No significant differences were found after computing p-values of the correlations. The researcher accepted the null hypothesis. There were no significant relationships between the size of the farm in acres and the identified channels of information used by fruit and vegetable farmers of Southwest Michigan for new agricultural practices.

Table 12 shows numbers, p-values and correlations, between channels of information used by farmers, their Age in number of years, and Size of their farm in acres.

To test the stated null hypotheses of single pairs means, the researcher utilized t-tests. Significance was set at 95% confidence level and two-tail probabilities were identified for significant differences of less than .05. The following null hypotheses were tested for difference between male farmers and female farmers with regard to the use of identified sources and channels of information.

Null Hypothesis 7: There is no significant difference between male farmers and female farmers with regard to the use of identified sources of information for new agricultural practices, among the fruit and vegetable farmers of Southwest Michigan.

The two-tailed probability of the t-tests were computed on the differences of means of male farmers and female farmers, with regard to the use of the identified sources of information. Data in Table 13 showed that 168 male farmers with a mean of 1.82 and standard deviation of 1.34, utilized Local Sales People significantly more than eight female farmers with means of .75 and a standard deviation of .70. The t-value for the means was 2.93 and two-tail probability was significant at .004.

One hundred and sixty-seven male farmers with a mean of 1.22 and standard deviation of 1.41, utilized Private Consultants significantly more than 9 female farmers with a mean of .22 and a standard deviation of .66. The t-value for these means was 2.12 and the two-tail probability was significant at .03. Table 13 shows all means, standard deviations, numbers, t-values and two-tail probabilities.

Because significant differences were found in the use of identified sources of information the researcher rejected the null hypothesis between male farmers and female farmers. The alternate hypothesis which stated that there is a significant difference between male farmers and female farmers with regard to the use of identified sources of

information for new agricultural practices by fruit and vegetable farmers of Southwest Michigan, was accepted.

Table 13. Results of t-test for Differences of Gender on Sources of Information for New Agricultural Practices

Sources of Information	Male Mean S.D. (Number)	Female Mean S.D. (Number)	t-value	2-Tail Prob.
Agricultural Stabilization Conservation Service Personnel	1.69 1.20 (171)	1.33 1.25 (9)	.88	.38
Cooperative Extension Service Personnel	2.27 1.05 (173)	2.44 1.01 (9)	-.48	.68
Farmer Home Administration	.54 .87 (164)	.50 .75 (8)	.15	.87
Farmers who are family members	1.84 1.34 (170)	1.77 1.30 (9)	.15	.88
Farmers who are not family members	1.83 1.10 (171)	1.90 1.37 (10)	-.18	.86
Local Sales people	1.82 1.02 (168)	.75 .70 (8)	2.93	.004*
Michigan State University Specialist	1.65 1.11 (169)	1.22 1.39 (9)	1.12	.26
Private Consultants	1.22 1.41 (167)	.22 .66 (9)	2.12	.03*
Product Company Representatives	2.14 1.16 (170)	1.11 1.05 (9)	2.62	.10
Soil Conservation Service Personnel	1.29 1.08 (171)	1.22 1.39 (9)	.19	.85
Vocational Agriculture Teachers	.23 .54 (169)	.12 .35 (8)	.54	.58
Other Sources	.87 1.06 (129)	.85 1.57 (7)	.04	.96

*Significantly less than .05 level for two-tail probability

Null Hypothesis 8: There is no significant difference between male farmers and female farmers with regard to the use of identified channels of information for new agricultural practices, by fruit and vegetable farmers of Southwest Michigan.

The two-tail probability of the t-test were computed on the differences in the means of male farmers and female farmers with regard to the use of the identified channels of information. The data in Table 14 revealed that 168 male farmers with a mean of 1.93 and standard deviation of 1.26, utilized Agriculture Trade Shows significantly more than 8 Female farmers with a mean of .87 and a standard deviation of 2.3. The two-tail probability was significant at .02.

Because significant difference were found between male farmers and female farmers the researcher rejected the null hypothesis. The alternate hypothesis which stated that there is a significant difference between male farmers and female farmers with regard to their use of identified channels of information for new agricultural practices among fruit and vegetable farmers of Southwest Michigan was accepted.

Table 14. Results of t-test for Differences of Gender on Channels of Information for Agricultural Practices

Channels of Information	Male Mean S.D. (Number)	Female Mean S.D. (Number)	t-value	2-Tail Prob.
Agricultural bulletins from MSU and other universities	2.45 .91 (172)	2.88 1.16 (9)	-1.37	.17
Agricultural Newsletters	1.71 1.15 (170)	2.12 1.35 (8)	-.97	.33
Agricultural Trade Shows	1.93 1.26 (168)	.87 .99 (8)	2.33	.02*
Daily Newspapers	2.16 1.16 (173)	1.44 1.23 (9)	1.81	.07
Demonstration plots on trials on farms	1.49 .96 (170)	1.33 1.65 (9)	.47	.64
Direct Mailings (letters)	2.08 1.14 (169)	2.10 1.44 (10)	-.03	.97
Farm Magazines	2.57 1.16 (172)	2.20 .91 (10)	1.00	.31
Field Days and Twilight Tours	1.35 .98 (170)	.87 1.24 (8)	1.34	.18
Office visits to ASCS, CES, FmHA, SCS	1.70 1.11 (170)	1.44 1.23 (9)	.67	.50
Radio Advertisements and programs	1.48 1.16 (172)	1.22 1.20 (9)	.67	.50
Television Advertisements and programs	1.05 .97 (172)	.88 1.16 (9)	.49	.62
Telephone recordings	1.10 1.24 (167)	.50 1.06 (8)	1.35	.17
Using the telephone to contact ASCS, CES, FmHA, SCS	2.01 1.25 (171)	2.00 1.73 (9)	.03	.97
Video Tape	.53	.00 No variance for independent sample t-test - one or more samples had no variance		

Table 14 (cont'd)

Channels of Information	Male Mean S.D. (Number)	Female Mean S.D. (Number)	t-value	2-Tail Prob.
Weekly or monthly ag newsletters	2.41 1.26 (169)	1.66 1.11 (9)	1.74	.08
Word of mouth from other farmers	2.38 .92 (170)	2.10 1.10 (10)	.95	.34
Other Channels	1.12 1.08 (114)	1.00 1.00 (5)	.25	.80

*Significantly different at less than .05 for two-tail probability

To determine if full-time farmers utilized identified sources or channels of information differently from part-time farmers, t-test were computed to test the following null hypotheses.

Null Hypothesis 9: There is no significant difference between full-time farmers and part-time farmers, with regard to the use of identified sources of information for new agricultural practices, among fruit and vegetable farmers of Southwest Michigan.

Table 15 shows the means, standard deviations, numbers, t-values and two-tail probabilities. Two-tail probabilities of t-tests were computed on the difference in the means between full-time farmers and part-time farmers with regard to the use of the identified sources of information. No significant differences in means were found between full-time farmers and part-time farmers. Therefore, the researcher must accept the null hypothesis.

Table 15. Results of t-test Results for Differences Between Part-Time and Full-Time Farmers for Sources of Information Used.

Sources or Information	Full-Time Mean S.D. (Number)	Part-Time Mean S.D. (Number)	t-value	2-Tail Prob.
Agricultural Stabilization Conservation Service Personnel	1.71 1.22 (126)	1.64 1.14 (53)	.37	.71
County Cooperative Extension Service Personnel	2.32 1.04 (126)	2.14 1.06 (55)	1.06	.29
Farmers Home Administration Personnel	.54 .83 (118)	.50 .89 (53)	.23	.81
Farmers you are family members	1.85 1.38 (122)	1.81 1.23 (55)	.16	.87
Farmers you are not family members	1.81 1.11 (124)	1.80 1.11 (55)	.08	.93
Local sale people	1.69 .96 (120)	1.90 1.15 (54)	-1.29	.20
Michigan State University Specialists	1.69 1.09 (123)	1.52 1.09 (54)	.92	.35
Private Consultants	1.18 1.38 (122)	1.16 1.45 (53)	.05	.96
Product Company Representatives	2.00 1.11 (124)	2.27 1.25 (54)	-1.43	.15
Soil Conservation Service	1.29 1.11 (123)	1.32 1.07 (55)	-.19	.84
Vocational Agriculture Teacher	.18 .46 (122)	.29 .66 (54)	-1.23	.22
Other Sources	.94 1.10 (93)	.64 1.00 (42)	1.51	.13

*Significant at less than .05 level for two-tail probability.

To determine if full-time farmers utilized identified channels of information different from part-time farmers, t-test were computed on the following hypotheses.

Null Hypothesis 10: There is no significant difference between full-time farmers and part-time farmers, with regard to the use of identified channels of information for new agricultural practices, among fruit and vegetable farmers of Southwest Michigan.

Two-tail probabilities of the t-tests were computed on the difference in the means, between full-time and part-time fruit and vegetable farmers of Southwest Michigan, with regard to the use of the identified channels of information. The data in Table 16 shows significant differences between 82 full-time farmers with a mean of 1.29 and a standard deviation of 1.07, and 38 part-time farmers with mean of .78 and standard deviation of 1.04, with regard to their use of, Other channels, of information. The t-value mean was 2.41 and the two-tail probability was significant at .01. Table 16 shows means, standard deviations, numbers, t-values and two-tail probabilities.

Because significant differences were found between full-time farmers and part-time farmers in their use of, Other Channels, of information, the author rejected the null hypothesis. The alternate hypothesis which stated that there is a significant difference between full-time farmers and part-time farmers in their use of identified channels of information for new agricultural practices, among fruit and vegetable farmers of Southwest Michigan, was accepted.

Table 16. Results of t-test for Differences Between Part-Time and Full-Time Farmers for Channels of Information Used

Channels of Information	Full-time Mean S.D. (Number)	Part-time Mean S.D. (Number)	t-value	2-Tail Prob.
Agricultural Bulletins	2.52 .95 (125)	2.36 .86 (55)	1.09	.27
Agricultural Newsletters	1.60 1.17 (123)	1.96 1.13 (54)	-1.07	.06
Agricultural Trade Shows	1.91 1.27 (121)	1.83 1.27 (54)	.40	.68
Daily Newspapers	2.15 1.22 (125)	2.11 1.11 (53)	.24	.81
Demonstration plots or trials on farms	1.53 1.02 (125)	1.39 .92 (53)	.86	.39
Direct mailings	2.15 1.16 (124)	1.88 1.12 (53)	1.41	.16
Farm Magazines	2.52 1.18 (126)	2.64 1.10 (54)	-.66	.51
Field Days and Twilight Tours	1.40 .96 (123)	1.18 1.04 (54)	1.37	.17
Microcomputer Communications	.52 .91 (123)	.37 .78 (54)	1.04	.29
Office visits to ASCS, CES, FmHA, SCS	1.69 1.10 (123)	1.70 1.14 (54)	-.02	.98
Radio Advertisements	1.57 1.14 (124)	1.23 1.13 (55)	1.81	.07
Television Advertisements	.99 .91 (125)	1.14 1.08 (54)	-.99	.32
Telephone Recordings	1.14 1.23 (122)	.82 1.23 (52)	1.57	.11
Using the telephone to contact ASCS, CES, FmHA, SCS	2.00 1.28 (125)	1.92 1.28 (54)	.35	.72

Table 16 (cont'd)

Channels of Information	Full-time Mean S.D. (Number)	Part-time Mean S.D. (Number)	t-value	2-Tail Prob.
Video tape	.53 .82 (120)	.46 .71 (54)	.54	.59
Weekly or monthly Ag Newsletter	2.37 1.28 (123)	2.33 1.23 (53)	.16	.86
Word of mouth from other farmers	2.39 .96 (124)	2.25 .89 (54)	.89	.37
Other Channels	1.29 1.07 (82)	.78 1.04 (38)	2.41	.01*

*Significant at less than .05 level for two-tail probability

One-Way Analysis of Variance (ANOVA) tests were used to determine differences in the means of sources and channels of information, when multiple variables were used. These variables included four types of education, three types of farm ownership and seven groups of farm income. The F-Probability was set at a .05 to achieve a confidence level of 95%.

Null Hypothesis 11: There is no significant difference between the levels of formal education of farmers with regard to the use of the identified sources of information for new agricultural practices, by fruit and vegetable farmers of Southwest Michigan.

One-Way Analysis of Variance (ANOVA) tests were computed for educational levels of less than high school, high school diploma, a two year degree, and a four year degree or more, with regard to the use of identified sources of information used by fruit and vegetable farmers of Southwest Michigan. The data shown in Table 17 revealed a significant difference when farmers used, Other Sources. Table 17 shows all F-Ratios and F-Probabilities. For numbers, means and standard deviations see Appendix I.

Table 17. One-Way Analysis of Variance of Sources when Considering Type of Formal Education of Farmers

Sources of Information	F-Ratio	F-Probability
Agricultural Stabilization Conservation Personnel	1.95	.12
County Cooperative Extension Agent	1.19	.31
Farmers Home Administration Personnel	.68	.56
Farmers who are family members	.51	.67
Farmers who are not family members	2.45	.06
Local sales people	2.00	.11
Michigan State University Specialist	.31	.81
Private Consultants	1.70	.16
Product Company Representatives	1.56	.20
Soil Conservation Service Personnel	.84	.47
Vocational Agriculture Teacher	1.51	.21
Other Sources	3.09	.02*

***Significant at less than .05 level.**

One-Way (ANOVA) tests computed for. Other Sources, and levels of formal education revealed a F-Probability of .02. A Tukey post hoc comparison revealed significant differences between farmers with less than a high school diploma with a mean of .38 and standard deviation of .76, and farmers with a four year degree or more with a mean of 1.30 and standard deviation of 1.23. Farmers with a four year degree or more used, Other Sources more than farmers with less than a high school diploma.

Since significant differences were found between farmers with less than a high school degree and farmers with a four year degree or more, the researcher rejected the null hypothesis. The alternate hypothesis which stated that there is a significant difference between the levels of formal education of farmers and the identified sources of information for new agricultural practices by fruit and vegetable farmers of Southwest Michigan was accepted.

Null Hypothesis 12: There is no significant difference between the levels of formal education of farmers with regard to the use of the identified channels of information for new agricultural practices, by fruit and vegetable farmers of Southwest Michigan.

One-Way Analysis of Variance (ANOVA) tests were computed for levels of education of less than high school diploma, high school diploma, two year degree, and four year degree or more, with regard to channels of information used by fruit and vegetable farmers of Southwest Michigan. The data shown in Table 18 revealed significant difference in means calculated for farmers who used the channels of Agriculture Trade Shows, Office visits to ASCS, CES, FmHA, SCS, Using the telephone to contact ASCS, CES, FmHA, SCS and Video Tape. Table 18 shows all F-Ratios and F-Probabilities. For number, means and standard deviations, see Appendix J.

Table 18. One-Way Analysis of Variance of Channels When Considering Type of Formal Education of Farmers

Channels of Information	F-Ratio	F-Probability
Agricultural Bulletins	.47	.70
Agricultural Newsletters	1.69	.16
Agricultural Trade Shows	4.62	.003*
Daily Newspapers	.26	.85
Demonstration plots or trials on farms	1.64	.18
Direct mailings	.15	.92
Farm Magazines	.68	.56
Field Days and Twilight Tours	.77	.50
Microcomputer Communications	.94	.41
Office visits to ASCS, CES, FmHA, SCS	2.86	.03*
Radio advertisements and programs	1.23	.29
Television advertisements and programs	1.81	.14
Telephone recordings	1.49	.21
Using the telephone to contact ASCS, CES, FmHA, SCS	3.65	.01*
Video Tape	3.80	.01*
Weekly or monthly Ag Newsletters	2.60	.05
Word of mouth from other farmers	1.30	.27
Other channels	.32	.80

***Significant at the less than .05 level**

One-Way Analysis of Variance (ANOVA) tests computed for the channel, Agricultural Trade Shows, and levels of formal education, shows a F-Probability of .003. A Tukey post hoc comparison revealed significant difference in mean between farmers with less than a high school diploma (mean of .88 and a standard deviation of .99), and the other three groups of farmers with a high school diploma (mean of 1.93 and a standard deviation of 1.30), farmers with a two year degree (mean of 2.04 and standard deviation of 1.12) and farmers with a four year degree or more (mean of 2.16 and a standard deviation of 1.21). Farmers with a high school diploma or more, used the channel of Agricultural Trade Shows significantly more than farmers with less than a

high school diploma, for information on new agricultural practices.

An ANOVA computed for the channel of Office visits to ASCS, CES, FmHA and SCS, and levels of formal education revealed a F-Probability of .03. A Tukey post hoc comparison reveal significant differences of means between farmers with less than high school diploma, (mean of 1.36 and standard deviation of 1.11), and farmers with a two year degree (mean of 2.20 and standard deviation of 1.19). Farmers with a two year degree used Office visits to USDA agencies as a channel of information, more than farmers with less than a high school diploma for information on new agricultural practices.

An ANOVA computed between the channel of Using the telephone to contact ASCS, CES, FmHA and SCS, and levels of formal education, shows a F-Probability of .01. A Tukey post hoc comparison revealed significant difference in mean between farmers with less than a high school diploma, (mean of 1.45 and standard deviation of 1.50), and farmers with a two year degree (mean of 2.53 and standard deviation of 1.30). Farmers with a two year degree, used the telephone to contact USDA agencies, as a channel of information more than farmers with less than a high school diploma.

An ANOVA computed between the channel of Video Tape and levels of formal education, shows a F-Probability of .01. A Tukey post hoc comparison revealed significant difference in mean between farmers with less than a high school diploma (mean of .06 and a standard deviation of .25) and farmers with a two year degree (mean of .88 and a standard deviation of 1.12). Farmers with a two year degree used Video Tape as a channel of information more than farmers with less than a high school diploma.

Because significant differences were found for the levels of formal education with regard to identified channels of information, the null hypothesis was rejected. The alternate hypothesis which stated that there is a significant difference between the levels of formal education of farmers and the identified channels of information for new agricultural practices by fruit and vegetable farmers of Southwest Michigan was accepted.

Null Hypothesis 13: There is no significant difference between the types of farm ownership with regard to the use of identified sources of information by fruit and vegetable farmers of Southwest Michigan, for new agricultural practices.

One-Way Analysis of Variance (ANOVA) tests were computed for types of farm ownership, owner operator, partnerships and corporations with regard to sources of information used by fruit and vegetable farmers of Southwest Michigan for new agricultural practices. F-Probabilities revealed significant difference in means, between the types of farm ownership, and the sources of information of Farmers Home Administration Personnel, Farmers who are family members, Michigan State University Specialist, Private Consultants and Other Sources. Table 19 shows all F-Ratios and F-Probabilities, for numbers, means and standard deviations see Appendix K.

Table 19. One-Way Analysis of Variance of Sources when Considering Type of Ownership of Farmers

Sources of Information	F-Ratio	F-Probability
Agricultural Stabilization Conservation Personnel	.33	.71
County Cooperative Extension Personnel	.56	.57
Farmers Home Administration Personnel	5.9	.003*
Farmers who are family members	3.05	.04*
Farmers who are not family members	.42	.65
Local sales people	.57	.56
Michigan State University Specialist	4.44	.01*
Private Consultants	4.94	.008*
Product Company Representatives	1.18	.30
Other Sources	4.34	.01*
Soil Conservation Service Personnel	.57	.56
Vocational Agriculture Teacher	.74	.47

***Significant at the less than .05 level.**

An ANOVA computed for the source of Farmers Home Administration personnel, and types of farm ownership revealed a F-Probability of .003. Tukey post hoc comparison revealed significant difference in means, between owner operators, (mean of .44 and standard deviation of .76), and partnerships (mean of 1.08 and standard deviation of 1.25). Partnerships used the source of Farmers Home Administration personnel, significantly more than owner operators for information on new agricultural practices.

An ANOVA computed for the source of Michigan State University Specialist, and type of farm ownership, revealed a F-Probability of .01. A Tukey post hoc comparison revealed significant difference in means, between owner operators (mean of 1.52 and standard deviation of 1.13), and corporations, (mean of 2.30 and standard deviation of 1.03). Corporations used the source of Michigan State University Specialists

significantly more than owner operators for information on new agricultural practices.

An ANOVA computed for, Other Sources, of information, and types of farm ownership, revealed a F-Probability of .01. A Tukey post hoc comparison revealed significant difference in means, between owner operators, with a (mean of .72 and standard deviation of 1.02), and partnerships, with a (mean of 1.44 and standard deviation of 1.14). Partnerships used, Other Sources, significantly more than owner operators for information on new agricultural practices.

The Tukey or Scheffee post hoc comparisons could not find differences of means scores on sources of information used by Farmers who are family members with a F-Probability of .04 and Private Consultants with a F-Probability of .008. Because significant differences were found between the types of farm ownership, and identified sources of information, the null hypothesis was rejected. The alternate hypothesis which stated that there is a significant difference between the types of farm ownership with regard to the use of identified sources of information by fruit and vegetable farmers of Southwest Michigan for new agricultural practices, was accepted.

Null Hypothesis 14: There is no significant difference between the types of farm ownership with regard to the use of the identified channels of information by fruit and vegetable farmers, for new agricultural practices.

One-Way Analysis of Variance (ANOVA) tests were computed for types of farm ownership, owner operators, partnerships, and corporation, with regard to identified channels of information used by fruit and vegetable farmers. Data shown in Table 20 revealed significant difference in means, between the types of farm ownership and these channels of information Agriculture Trade Shows, Telephone Recordings, Video Tape

and Other Channels. Table 20 shows all F-Ratios and F-Probabilities, for numbers, means and standard deviations see Appendix L.

Table 20. One-Way Analysis of Variance of Channels When Considering Type of Ownership of Farmers

Channels of Information	F-Ratio	F-Probability
Agricultural Bulletins from MSU and other Universities	.68	.50
Agricultural Newsletters	1.16	.31
Agricultural Trade Shows	7.32	.0009*
Daily Newspapers	.26	.76
Demonstration plots or trials on farms	2.67	.07
Direct mailings	.10	.89
Farm Magazines	2.34	.09
Field Days and Twilight Tours	2.89	.05
Microcomputer Communications	.77	.46
Office visits to ASCS, CES, FmHA, SCS	.23	.78
Radio advertisements and programs	.14	.86
Television advertisements and programs	1.26	.28
Telephone recordings	4.41	.01*
Using the telephone to contact ASCS, CES, FmHA, SCS	1.51	.22
Video Tape	4.19	.01*
Weekly or monthly Ag Newsletters	1.40	.24
Word of mouth from other farmers	2.18	.11
Other channels	5.33	.006*

***Significant at less than .05.**

An ANOVA computed for the channel of Agricultural Trade Shows, and types of farm ownership, revealed a significant F-Probability of .0009. A Tukey post hoc comparison revealed significant difference in means between owner operators, with a (mean of 1.69 and standard deviation of 1.25), and partnerships, with a (mean of 2.52 and standard deviation of 1.15), also corporations, with a (mean of 2.61 and a standard deviation of .86). Partnerships and corporations used the channel of Agricultural Trade

Shows significantly more than owner operators, for information on new agricultural practices.

An ANOVA computed for the channel of Telephone recordings, and types of farm ownership, revealed a significant F-Probability of .01. A Tukey post hoc comparison revealed significant difference in means, between owner operators, with a (mean of .97 and a standard deviation of 1.23), and partnerships, with a (mean of 1.76 and a standard deviation of 1.30). Partnerships used the channel of Telephone recordings, significantly more than owner operators, for information on new agricultural practices.

An ANOVA computed for the channel of Video Tape, and types of farm ownership, revealed a significant F-Probability of .01. A Tukey post hoc comparison revealed significant differences of means between owner operators, with a (mean of .44 and standard deviation of .75) and corporations, with a (mean of 1.07 and standard deviation of 1.11). Corporations used the channel of Video Tape, significantly more than owner operators, for information on new agricultural practices.

An ANOVA computed for Other Channels, and types of farm ownership revealed a significant F-Probability of .006. A Tukey post hoc comparison revealed significant difference in means between owner operators, with a (mean of .93 and standard deviation of 1.03) and partnerships, with a (mean of 1.68 and standard deviation of 1.05). Partnerships used the channel of Other Channels, significantly more than owner operators, for information on new agricultural practices.

The Tukey or Sheffee post hoc comparisons could not find differences of mean scores of the channel of information of Telephone recordings with an F-Ratio of 4.41 and an F-Probability of .01.

Because significant differences were found between types of farm ownership with

regard to identified channels of information, the null hypothesis was rejected. The alternate hypothesis which stated that there is a significant difference between the types of farm ownership with regard to the use of identified channels of information by fruit and vegetable farmers of Southwest Michigan for new agricultural practices was accepted.

To determine if gross farm income had a significant effect on the use of sources or channels of information used by fruit and vegetable farmers of Southwest Michigan for new agricultural practices, One-Way Analysis of Variance (ANOVA) tests were computed on the following null hypotheses.

Null Hypothesis 15: There is no significant difference between gross farm incomes with regard to the use of identified sources of information by fruit and vegetable farmers of Southwest Michigan, for new agricultural practices.

One-Way Analysis of Variance (ANOVA) tests were computed for gross farm income groups, including:

Group 1 = less than $5,000
Group 2 = $5,001 to $10,000
Group 3 = $10,001 to $25,000
Group 4 = $25,001 to $50,000
Group 5 = $50,001 to $100,000
Group 6 = $100,001 to $250,000
Group 7 = greater than $250,000

with regard to identified sources of information used by fruit and vegetable farmers. Data shown in Table 21 revealed significant difference in means, between income groups, and these sources of information Farmers who are family members, Michigan State University Specialists, Private Consultants and Other Sources. Data in Table 21 shows all F-Ratios and F-Probabilities, for numbers, means and standard deviations see Appendix M.

Table 21. One-Way Analysis of Variance of Sources when Considering Gross Farm Income

Sources of Information	F-Ratio	F-Probability
Agricultural Stabilization Conservation Personnel	1.22	.29
County Cooperative Extension Personnel	1.21	.30
Farmers Home Administration Personnel	1.20	.30
Farmers who are family members	4.84	.0001*
Farmers who are not family members	1.66	.13
Local sales people	1.13	.34
Michigan State University Specialist	4.60	.0002*
Private Consultants	3.47	.003*
Product Company Representatives	.76	.59
Soil Conservation Service Personnel	1.74	.11
Vocational Agriculture Teacher	.91	.48
Other Sources	3.41	.003*

***Significant at the less than .05 level**

An ANOVA computed for the source of Farmers who are family members, and gross farm income, revealed a significant F-Probability of .0001. A Tukey post hoc comparison revealed significant difference in means, between group 3, ($10,001 to $25,000) with a (mean of 1.12 and a standard deviation of 1.31) and other groups, including group 5 ($50,001 to $100,000) with a (mean of 2.42 and a standard deviation of 1.27) and group 6, ($100,001 to $250,000) with a (mean of 2.50 and standard deviation of 1.01). Farmers with farm incomes of $50,001 to $250,000 used the source of Farmers who are family members, significantly more than farmers with farm income of $10,001 to $25,000 for information on new agricultural practices.

An ANOVA computed for the source of Michigan State University Specialist and gross farm income, revealed a significant F-Probability of .0002. A Tukey post hoc comparison revealed significant difference in means between income group 1, (less than $5,000) with a (mean of 1.16 and standard deviation of 1.18) and other income groups,

including groups 5, ($50,001 to $100,000) with a (mean of 2.15 and standard deviation of 1.18) and income group 6, ($100,001 to $250,000) with a (mean of 2.04 and a standard deviation of .70) and income group 7, (greater than $250,000) with a (mean of 2.27 and a standard deviation of .82). Farmers with farm income of $50,001 to greater than $250,000, used the source of Michigan State University Specialist, significantly more than farmers with farm incomes of less than $5,000, for information on new agricultural practices.

An ANOVA computed for the source, Private Consultants, and gross farm income revealed a significant F-Probability of .003. A Tukey post hoc comparison revealed significant difference in means between income group 1, (less than $5,000) with a (mean of .64 and a standard deviation of 1.11), and income group 7 (greater than $250,000) with a (mean of 2.11 and a standard deviation of 1.49). Significant difference in means were found between income group 2, with a (mean of .56 and standard deviation of 1.15) and income group 7. Farmers with farm incomes of more than $250,000, used the source, Private Consultants, significantly more than farmers with farm income less than $10,000, for information on new agricultural practices.

An ANOVA computed for Other Sources and gross farm income revealed a significant F-Probability of .003. A Tukey post hoc comparison revealed significant difference in means, between income group 7, with a (mean of 1.60 and standard deviation of .73) and other income groups including income group 1, with a (mean of .53 and standard deviation of 1.10), and income group 2, with a (mean of .30 and standard deviation of .75). Farmers with farm income more than $250,000 used Other Sources significantly more than farmers with less than $10,000, for new agricultural practices.

Because significant differences were found in the means between gross farm income groups, with regard to identified sources, the null hypothesis was rejected. The alternate hypothesis which stated that there is a significant difference between gross farm incomes with regard to the use of identified sources of information by fruit and vegetable farmers of Southwest Michigan for new agricultural practices, was accepted.

Null Hypothesis 16: There is no significant difference between gross farm income with regard to the use of the identified channels by fruit and vegetable farmers of Southwest Michigan, for new agricultural practices.

One-Way Analysis of Variance (ANOVA) tests were computed for these groups of gross farm income:

Group 1 = less than $5,000
Group 2 = $5,001 to $10,000
Group 3 = $10,001 to $25,000
Group 4 = $25,001 to $50,000
Group 5 = $50,001 to $100,000
Group 6 = $100,001 to $250,000
Group 7 = greater than $250,000

with regard to identified channels of information used by fruit and vegetable farmers of Southwest Michigan. Data shown in Table 22 revealed significant difference in means, between the above income groups and these channels of information of Agriculture Trade Shows, Farm Magazines, Field Days and Twilight Tours, Using the telephone to contact ASCS, CES, FmHA and SCS, Video Tape, Weekly and monthly agriculture newsletters and Other Channels. Table 22 shows all F-Ratios and F-Probabilities, for numbers, means and standard deviations see Appendix N.

Table 22. One-Way Analysis of Variance of Channels when Considering Gross Farm Income

Channels of Information	F-Ratio	F-Probability
Agricultural Bulletins from MSU and other universities	.70	.64
Agricultural Newsletters	1.00	.42
Agricultural Trade Shows	7.31	.00*
Daily Newspapers	.74	.61
Demonstration plots or trials on farms	2.07	.05
Direct mailings	1.00	.42
Farm Magazines	2.31	.03*
Field Days and Twilight Tours	4.49	.0003*
Microcomputer Communications	1.41	.21
Office visits to ASCS, CES, FmHA, SCS	1.21	.30
Radio advertisements and programs	.74	.61
Television advertisements and programs	.83	.54
Telephone recordings	1.55	.16
Using the telephone to contact ASCS, CES, FmHA, SCS	2.55	.02*
Video Tape	2.90	.01*
Weekly or monthly Ag Newsletters	5.12	.0001*
Word of mouth from other farmers	2.02	.06
Other channels	3.05	.008*

***Significant at the less than .05 level**

An ANOVA computed for the channel, Agriculture Trade Shows, and gross farm income, revealed a significant F-Probability of .00. A Tukey post hoc comparison revealed significant difference in means, between income group 1, (less than $5,000) with a (mean of 1.43 and a standard deviation of 1.33), and other income groups including income group 6 ($100,001 to $250,000) with a (mean of 2.54 and a standard deviation of .93) and income group 7 (greater than $250,000) with a (mean of 3.05 and a standard deviation of .80). Farmers with farm income more than $100,001 used the channel, of Agricultural Trade Shows, significantly more than farmers with farm income of less than $5,000, for information on new agricultural practices.

A Tukey post hoc comparison detected a significant difference between income

group 2, with a (mean of 1.00 and standard deviation of 1.11), and other income groups including income group 5 with a (mean of 2.15 and standard deviation of 1.15), and income groups 6 and 7. Farmers with farm incomes of $50,001 to more than $250,000, used the channel of Agriculture Trade Shows significantly more than farmers with farm income of $5,001 to $10,000, for information on new agricultural practices.

A Tukey post hoc comparison detected significant difference in means, of income groups between income group 3 with a (mean of 1.71 and standard deviation of 1.32), also income group 4 with a (mean of 1.70 and standard deviation of 1.12), were significantly different from the mean of income group 7. Farmers with farm incomes of more than $250,000 used the channel of Agricultural Trade Shows, significantly more than farmers with farm income of $10,001 to $50,000, for information on new agricultural practices.

An ANOVA computed for the channel, Field Days and Twilight Tours, and gross farm income, revealed a significant F-Probability of .0003. A Tukey post hoc comparison revealed significant difference in means between income group 1 with a (mean of 1.06 and a standard deviation of 1.01), and income group 6 with a (mean of 1.83 and standard deviation of .86). Farmers with farm incomes of $100,001 to $250,000 used the channel, Field Days and Twilight Tours, significantly more than farmers with farm income of less than $5,000, for information on new agricultural practices.

Also found were difference in means, between income group 2 with a (mean of .70 and standard deviation of .77), and other income groups including income group 6 and 7 with a (mean of 1.77 and standard deviation of .73). Farmers with farm income of more than $100,001 used the channel, of Field Days and Twilight Tours, significantly

more than farmers with farm income of $5,001 to $10,000, for information on new agricultural practices. Income group 4, with a (mean of .90 and standard deviation of .85), was significantly different from the mean for income group 6. Farmers with farm income of $100,001 to $250,000 used the channel, Field Days and Twilight Tours, significantly more than farmers with farm income of $25,001 to $50,000, for information on new agricultural practices.

An ANOVA computed for the channel, Using the telephone to contact ASCS, CES, FmHA and SCS, and gross farm income, revealed a significant F-Probability of .02. A Tukey post hoc comparison revealed significant difference in means, between income group 1 with a (mean of 1.45 and a standard deviation of 1.09), and income group 6 with a (mean of 2.58 and a standard deviation of .97). Farmers with farm income of $100,001 to $250,000 used the channel, Using the telephone to contact ASCS, CES, FmHA and SCS, significantly more than farmers with farm income of less than $5,000, for information on new agricultural practices.

An ANOVA computed for the channel of Video Tape and gross farm income revealed a significant F-Probability of .01. A Tukey post hoc comparison revealed significant difference in means, between income group 1 with a (mean of .20 and standard deviation of .61), and income group 7 with a (mean of .93 and standard deviation of .92). Farmers with farm income of more than $250,000, used the channel of Video Tape significantly more than farmers with farm income of less than $5,000, for information on new agricultural practices.

An ANOVA computed for the channel, Weekly or monthly agricultural newsletters, and gross farm income, revealed a significant F-Probability of .0001. A Tukey post hoc comparison revealed significant difference in means, between income

group 1 with a (mean of 1.70 and standard deviation of 1.36), and other income groups including income group 6 with a (mean 2.91 and standard deviation of .88) and income group 7 with a (mean of 3.22 and standard deviation of .94). Also detected were difference in means, between income group 2 with a (mean of 1.76 and standard deviation of 1.30), and income groups 6 and 7. Farmers with farm incomes of more than $100,001 use the channel, Weekly or monthly agricultural newsletters, significantly more than farmers with farm income less than $10,000, for information on new agricultural practices.

An ANOVA computed for the channel of Other Channels and gross farm income, revealed a significant F-Probability of .008. A Tukey post hoc comparison revealed significant difference in means between income group 1 with a (mean of .50 and standard deviation of .80), and income group 7, with a (mean of 1.75 and a standard deviation of .86). Farmers with farm income greater than $250,000, used the channel Other Channels significantly more than farmers with farm income of less than $5,000, for information on new agricultural practices.

Tukey or Scheffee post hoc comparisons were unable to determine the significant difference between the groups of means computed for farm income, and the identified channel, Farm Magazines, with a significant F-Probability of .03.

Because significant differences were found between the means computed for gross farm income groups with regard to identified channels, the null hypothesis was rejected. The alternate hypothesis which stated that there is a significant difference between gross farm income with regard to the use of identified channels of information by fruit and vegetable farmers of Southwest Michigan for new agricultural practices was accepted.

Non-Respondents

The researcher sought to determine if there was a significant difference between respondents to the survey and non-respondents to the survey, after the survey deadline of July 30, 1990. Sixteen names were randomly selected of the 65 non-respondents. Sixteen represents approximately 25% of the non-respondent group. These 16 individuals were telephoned and asked about selected characteristics from Part II of the survey, including their current age, number of years in farming, total number of acres farmed, total number of acres owned and the total number of acres rented. It was found by using t-test on respondents that there was no significant difference between respondents and non-respondents (Appendix H). It was therefore determined, that there was no significant difference between the two groups, personal and farm characteristics and that information received on the respondent would not be different statistically, even if all 275 surveys had been received.

Summary

Sources used by the respondents were ranked in the following order; Cooperative Extension personnel followed by Product Company Representatives, Farmers who are family members, Farmers who are not family members, Local Sales People, Agricultural Stabilization Conservation Service Personnel, Michigan State University Specialists, Soil Conservation Service Personnel, Private Consultants, Other Sources, Farmers Home Administration and Vocational Agricultural Teachers.

Of channels used, the ranking was as follows: Farm Magazines, Agricultural Bulletins, Weekly or monthly Ag Newsletters, Word of Mouth from other farmers, Daily Newspapers, Direct Mailings, Using the telephone to contact ASCS, CES, FmHA, SCS,

Agricultural Trade Shows, Agriculture News Letters, Office visits to ASCS, CES, FmHA, SCS, Demonstration plots or trials on farms, Radio Advertisements and programs, Field Day and Twilight Tours, Others Channels, Telephone Recordings, Television Advertisements and programs, Video Tape, and Microcomputer Communications.

CHAPTER V

SUMMARY

The first part of Chapter V contains a discussion of the research questions, procedures used by the researcher, and results from various statistical tests. The second section includes major conclusions reached from the findings for sources and channels of information used by farmers to receive new information on agricultural practices. Implications, based on study findings are discussed in the third section. Limitations that were encountered in the study are presented in section four. The final section states recommendations for future research in this important area of dissemination of information.

As cost of direct mail rises and commercial companies increase their use of advertising in all forms of media, agricultural educators, both formal and non-formal, must direct their energies toward the delivery of unbiased agricultural information. They must use the most sought after and least costly information channels used by farm operators. This delivery must be in a form which can be easily accessible to all types of farmers. Farm types have changed over the past 30 years. According to the Census of Agricultural for the United States, more of our farm operators are operating part-time. Farms had become larger in acreage, overall, and farmers had increased access to a greater variety of channels.

Agricultural educators faced a challenge to know our audience and their needs for agricultural information. It was with this challenge in mind that this study was designed. The focus of the study was to find answers to the questions of farmer use of selected agricultural information sources and channels. It was also important to determine if selected personal and demographic characteristics had an effect on these sources or channels, by investigating fruit and vegetable farmers from five counties in Southwest Michigan.

To accomplish the stated purposes the following objectives were established:

1. To determine what sources of information fruit and vegetable farmers, in selected Southwest Michigan counties used, to receive information on agricultural practices.

2. To determine what channels of information fruit and vegetable farmers, in selected Southwest Michigan counties used, to receive information on agricultural practices.

3. To determine if part-time farmers differ from full time farmers in their selection of sources or channels of information concerning new agricultural practices among fruit and vegetable farmers in Southwest Michigan.

4. To determine if there is relationship between the age of the farmers and sources or channels used by fruit and vegetable farmers of Southwest Michigan to receive information concerning new agricultural practices.

5. To determine if the size, in number of acres, of a farming operation governs which sources or channels fruit and vegetable farmers of Southwest Michigan used to receive information on new agricultural practices.

6. To determine if the number of years the person has been in fruit and vegetable farming had a relationship to the source or channel for receiving information on new agricultural practices.

7. To determine if the number of years of formal education had a relationship to the source or channel that fruit and vegetable farmers used to receive new agricultural practices.

8. To determine if gross dollar earnings from the fruit and vegetable farm effected sources or channels farmers used to receive information concerning new agricultural practices.

Based on research questions and the literature review, hypotheses were formulated.

Research Question 1: What was the frequency of use of selected sources and selected channels of information, by fruit and vegetable farmers selected from five counties in Southwest Michigan, to gain information on new agricultural practices?

Research Question 2: Does the size of the farm in acres affect the use of sources or channels for gaining information on new agricultural practices used by fruit and vegetable farmers in five selected counties in Southwest Michigan?

> Hypothesis 5: There is a significant relationship between the size of the farm in acres and identified sources of information, used by fruit and vegetable farmers of Southwest Michigan, for new agricultural practices.
>
> Hypothesis 6: There is a significant relationship between the size of the farm in acres and identified channels of information, used by fruit and vegetable farmers of Southwest Michigan, for new agricultural practices.

Research Question 3: Does the gross dollar earnings of the farm influence a farmer's use of sources or channels for gaining information on new agricultural practices used by fruit and vegetable farmers in five selected counties in Southwest Michigan?

> Hypothesis 15: There is a significant difference between gross farm incomes with regard to the use of the identified sources by fruit and vegetable farmers of Southwest Michigan, for new agricultural practices.
>
> Hypothesis 16: There is a significant difference between gross farm income with regard to the use of the identified channels by fruit and vegetable farmers of Southwest Michigan, for new agricultural practices.

Research Question 4: Does the time a farmer spends working off the farm, make a difference in the use of sources or channels for gaining information on new agricultural practices used by fruit and vegetable farmers of five selected counties in Southwest Michigan?

> Hypothesis 9: There is a significant difference between full-time farmers and part-time farmers, with regard to the use of identified sources of information for new agricultural practices, among fruit and vegetable farmers of Southwest Michigan.
>
> Hypothesis 10: There is a significant difference between full-time and part-time farmers with regard to the use of identified channels of information for new agricultural practices, among fruit and vegetable farmers of Southwest Michigan.

Research Question 5: Does the age of a farmer have an effect on the use of sources or channels for gaining information on new agricultural practices used by fruit and vegetable farmers of five selected counties in Southwest Michigan?

> Hypothesis 1: There is a significant relationship between the age of the farmer and the identified sources of information, used by fruit and vegetable farmers of Southwest Michigan, for new agricultural practices.
>
> Hypothesis 2: There is a significant relationship between the age of the farmer and the identified channels of information, used by fruit and vegetable farmers of Southwest Michigan, for new agricultural practices.

Research Question 6: Does the amount or level of formal education a farmer has, have an effect on the use of sources or channels for gaining information on new agricultural practices used by fruit and vegetable farmers of five selected counties in Southwest Michigan?

> Hypothesis 11: There is a significant difference between the levels of formal education of farmers with regard to the use of the identified sources of information for new agricultural practices by fruit and vegetable farmers of Southwest Michigan.
>
> Hypothesis 12: There is a significant difference between the levels of formal education of farmers with regard to the use of the identified channels of information for new agricultural practices by fruit and vegetable farmers of Southwest Michigan.

Research Question 7: Does the number of years a person has been farming have an effect on the use of sources or channels for gaining information on new agricultural practices used by fruit and vegetable farmers in five selected counties in Southwest Michigan?

> Hypothesis 3: There is a significant relationship between the number of years in farming and identified sources of information, used by fruit and vegetable farmers of Southwest Michigan, for new agricultural practices.
>
> Hypothesis 4: There is a significant relationship between the number of years in farming and identified channels of information, used by fruit and vegetable farmers of Southwest Michigan, for new agricultural practices.

Research Question 8: Does gender have an effect on use of sources or channels for gaining information on new agricultural practices by fruit and vegetable farmers of five selected counties in Southwest Michigan.

> Hypothesis 7: There is a significant difference between male farmers and female farmers, with regard to the use of identified sources of information for new agricultural practices, among fruit and vegetable farmers of Southwest Michigan.

Hypothesis 8: There is a significant difference between male farmers and female farmers, with regard to the use of identified channels of information on new agricultural practices, among fruit and vegetable farmers of Southwest Michigan.

Research Question 9: Does the type of ownership affect the use of sources or channels for gaining information on new agricultural practices used by fruit and vegetable farmers of selected five counties in Southwest Michigan.

Hypothesis 13: There is a significant difference between the types of farm ownership with regard to the use of identified sources of information by fruit and vegetable farmers of Southwest Michigan, for new agricultural practices.

Hypothesis 14: There is a significant difference between the types of farm ownership with regard to the use of identified channels of information by fruit and vegetable farmers of Southwest Michigan, for new agricultural practices.

The survey method was used to determine sources and channels of information used for receiving information on new agricultural practices by fruit and vegetable farmers. Personal and farm characteristics were described. A mailed instrument was used to survey the fruit and vegetable farmers in five counties of Southwest Michigan. Data was collected using a questionnaire developed by the researcher, and approved by the University Committee of Research Involving Human Subjects. The questionnaire had two parts. Part I asked farmers to identify their use of selected sources and channels using a 5 point scale. Respondents circled 4 if they Always Used the practice, 3 if they Usually Used the practice, 2 if they Sometimes Used the practice, 1 if they Seldom Used the practice and 0 if they Never Used the practice. Part II of the survey requested personal and demographic characteristics of the farmers, including current age, gender, formal education, number of years farmers have been involved in farming, number of days the farmer worked off the farm, current number of acres owned and rented, types of farm ownership, and gross dollar earnings from the farm on an average over the past five years.

The population for this study were farmers who were on the Cooperative

Extension Service mailing list of the counties of Allegan, Berrien, Cass, Kalamazoo and Van Buren. The population included 970 names received from these counties. Microcomputer software SPSS PC+ was used to generate a random sample of 275 farmers.

A cover letter co-signed by the researcher and the district horticulture agent, Theodore M. Thomas, was included with the questionnaire along with a response postcard. The cover letter contained instructions on how to complete the questionnaire and also explaining the importance of the entire research project.

A follow-up questionnaire was mailed after a two week period. Two weeks later a postcard reminder was mailed. The useable survey response rate was 69% (190 usable surveys of the 275 surveys mailed). Sixteen farmers, representing 25% of the 65 that did not respond, were telephoned and asked questions from Part II of the survey to determine differences of personal or farm characteristics of respondents versus non-respondents. Validity was established through a jury of experts. Reliability was established with Cronback's alfa. A reliability coefficient of .76 and .82 was established with microcomputer software.

Frequencies were used to describe the sources and channels selected by the fruit and vegetable farmers. Frequency counts, percentages, means and standard deviations were calculated on questions of the instrument. One-way Analysis of Variance (ANOVAs) and t-tests were used to determine significant differences between respondent use of sources or channels of information and farmer characteristics. Scheffee or Tukey tests were used as a post hoc multiple comparison procedures, at a .05 level of significance, to determine a 95% confidence level.

Conclusions

The research questions and major findings from testing null hypotheses presented in Chapter IV, are listed here, with conclusions.

Research Questions 1: What was the frequency of the use of selected sources and selected channels of information by fruit and vegetable farmers, in five selected counties of Southwest Michigan, for gaining information on new agricultural practices?

Findings: 1. County Cooperative Extension Service personnel with a mean of 2.29 ranked first as a source of agricultural information. Product Company Representatives with a mean of 2.09 ranked second. Farmers who are either family members or not family members with means of 1.84 ranked third, as a source of agricultural information.

2. Sources of agricultural information which were lowest ranked by fruit and vegetable farmers were, Vocational Agricultural Teachers and Farmers Home Administration Personnel. Farmers Home Administration with a mean of .54 ranked tenth. Vocational Agriculture Teachers had a mean ranking of .22 on the 5 point scale of 4 to 0, and were ranked last of eleven sources.

3. Farm Magazines, with a mean of 2.56 ranked first as the most used channel of agricultural information. Agricultural bulletins from Michigan State University or other universities with a mean of 2.48 ranked second. Weekly or monthly agricultural newsletters with a mean of 2.37 ranked as the third most used channel of information.

4. Channels which were least often used by fruit and vegetable farmers, were Television advertisements and programs, with a mean of 1.05. Television advertisements and programs ranked 16th out of a possible 18 channels. Video Tape with a mean of .79 ranked seventeenth. Microcomputer Communications with a mean of .48 ranked eighteenth, and the lowest ranked of all channels of information.

Conclusions: Traditional sources of agricultural information, such as, Cooperative Extension Service personnel, Product Company Representatives, and other farmers, both Family and non family members are used most often by fruit and vegetable farmers of Southwest Michigan, for information on new agricultural practices. Statistical results were comparable to past studies on adoption of farming practices. Cooperative Extension Service personnel may have an inflated mean due to the original population coming from mailing lists of the Cooperative Extension office in each of the five counties of Southwest Michigan.

Research Question 2: Does the size of the farm in acres affect the use of sources or channels for gaining information on new agricultural practices used by fruit and vegetable farmers in five selected counties of Southwest Michigan?

Hypothesis 5: There is a significant relationship between the size of the farm in acres and identified sources of information, used by fruit and vegetable farmers in Southwest Michigan, for new agricultural practices.

Hypothesis 6: There is a significant relationship between the size of the farm in acres and identified channels of information, used by fruit and vegetable farmers of Southwest Michigan, for new agricultural practices.

Findings: 1. The data indicated that farm size had significant impact on sources, as farm size increased farmers used Private Consultants significantly more often as a source of information.

Conclusions: Farm size was not a major factor when farmers chose the identified sources or channels of information. However, Private Consultants were used by larger farms. Access to sources and channels has more to do with other personal or farm characteristics than farm size of acres.

Research Question 3: Does the gross dollar earnings of the farm influence a farmer's use of sources or channels for gaining information on new agricultural practices used by fruit and vegetable farmers in fives selected counties of Southwest Michigan?

Hypothesis 15: There is a significant difference between gross farm incomes with regard to the use of the identified sources fruit and vegetable farmers of Southwest Michigan, for new agricultural practices.

Hypothesis 16: There is a significant difference between gross farm income with regard to the use of the identified channels by fruit and vegetable farmers of Southwest Michigan, for new agricultural practices.

Gross farm income did influence the use of sources and channels.

Findings: 1. Those farmers whose gross farm earnings were between $50,001 to $100,000 used Farmers who are family members as a source, more than those farms that had gross earning of $10,001 to $25,000.

2. As gross dollar earnings increased, the use of Michigan State University Specialists as a source of information also increased significantly.

3. Farms grossing over $250,000 used Private Consultants as a source, significantly more than those farms grossing under $5,000.

4. Farmers grossing over $100,000 used Agricultural Trade Shows as a source of information, significantly more than any of the farmers grossing under $100,000.
5. As gross dollars received from the farm increased, the use of Farm Magazines also increased significantly.
6. Farmers with gross earnings of $100,001 to $250,000 utilized Field Days and Twilight Tours significantly more than farmers with a gross income of $5,001 to $10,000.
7. As the income from gross dollar sales increased farmers used the telephone significantly more to contact ASCS, CES, FmHA and SCS offices.
8. As gross dollar sales increased on the farm the use of Video Tape as a channel to receive information also increased significantly.
9. Growers grossing over $100,000 used Weekly or monthly ag newsletters significantly more than growers grossing under $10,000 or less as channel of information on new agricultural practices.

Conclusions: From the testing of the null hypotheses it was determined that as farm income increased, the use of Michigan State University Specialists, Farm Magazines, Use of the telephone and Video Tapes also increased as sources or channels of information. Farms with higher incomes used a wider variety of sources, more than farms receiving lower gross farm incomes. The differences in the findings were between groups with under $50,000 and those with gross income of over $50,000.

Research Question 4: Does the time the farmer spends working off the farm, make a difference in the use of sources or channels for gaining information on new agricultural practices used by fruit and vegetable farmers of five selected counties of Southwest Michigan?

Hypothesis 9: There is a significant difference between full-time farmers and part-time farmers, with regard to the use of identified sources of information by fruit and vegetable farmers of Southwest Michigan, for new agricultural practices.

Hypothesis 10: There is a significant difference between full-time and part-time farmers, with regard to the use of identified channels of information by fruit and vegetable farmers of Southwest Michigan, for new agricultural practices.

Findings: 1. The test completed for the null hypothesis showed a significant difference between Part-Time or Full-Time farmers in their use of Other Channels for gaining information on new agricultural practices.

Conclusions: Part-time farmers and full-time farmers use the identified sources and identified channels equally except for Other Channels. Time spent off the farm was not a major factor in using sources or channels of information for new agricultural practices.

Research Question 5: Does the age of the farmer have an effect on the use of sources or channels for gaining information on new agricultural practices used by fruit and vegetable farmers of five selected counties of Southwest Michigan?

Hypothesis 1: There is a significant relationship between the age of the farmer and the identified sources of information, used by fruit and vegetable farmers of Southwest Michigan, for new agricultural practices.

Hypothesis 2: There is a significant relationship between the age of the farmer and the identified channels of information, used by fruit and vegetable farmers of Southwest Michigan, for new agricultural practices.

There were significant differences in there use of sources and channels about new agricultural information, among different age groups.

Findings: 1. Older farmers used Agricultural Bulletins, Daily Newspapers and Direct mailings significantly more than younger farmers.

2. Younger farmers attended Agricultural Trade Shows, used a Microcomputer Communications, used Video Tapes and used Weekly or monthly ag newsletters significantly more than older farmers.

3. Younger farmers used the telephone to contact the ASCS, CES, FmHA and SCS offices and also other farmers, both Family members and non family members, significantly more than their older counterparts.

Conclusions: Older farmers used more traditional forms of information than their younger counterparts. Younger farmers used more recent or newer forms of sources or channels. Younger farmers also used a greater variety of both sources and channels than older farmers.

Research Question 6: Does the amount or level of formal education a farmer has, have an effect on the use of sources or channels for gaining information on new agricultural practices used by fruit and vegetable farmers of five selected counties of Southwest Michigan?

Hypothesis 11: There is a significant difference between the levels of formal education of farmers with regard to the use of the identified sources of information for new agricultural practices by fruit and vegetable farmers of Southwest Michigan.

Hypothesis 12: There is a significant difference between the levels of formal education of farmers with regard to the use of the identified channels of information for new agricultural practices by fruit and vegetable farmers of Southwest Michigan.

Analysis showed that there were significant differences in the use of sources and channels of agricultural information between farmers with different levels of formal education.

Findings: 1. Farmers with a high school diploma, two year degree or four degree or more, utilized Agricultural Trade Shows as a channel of information, significantly more than farmers with less than a high school diploma.

2. Farmers having a two year degree above high school used the channels of Office visits to ASCS, CES, FmHA and SCS and Video Tape significantly more than farmers who had less than a high school diploma.

Conclusions: Four of the eighteen channels were used by farmers with a higher education significantly more than farmers with less than a high school education.

Research Question 7: Does the number of years a person has been farming have an effect on the use of sources or channels for gaining information on new agricultural practices used by fruit and vegetable farmers in five selected counties of Southwest Michigan?

Hypothesis 3: There is a significant relationship between the number of years in farming and identified sources of information, used by fruit and vegetable farmers of Southwest Michigan, for new agricultural practices.

Hypothesis 4: There is a significant relationship between the number of years in farming and identified channels of information, used by fruit and vegetable farmers of Southwest Michigan, for new agricultural practices.

There was a significant difference with farmers in regards to the number of years they have been involved in farming.

Findings: 1. The fewer years a farmer had been farming, the more they utilized Farmers who were not family members. They also used Local Sales People as a source of information more than farmers with more years in farming.

2. Farmers with fewer years in farming utilized Microcomputer Communications, Telephone recordings and Video Tape as channels of information, significantly more than farmers who had been in farming for longer period of time.

3. Farmers with increased experience or years in farming used Daily Newspapers and the Soil Conservation Service Personnel, significantly more as sources of information than farmers with less experience.

Conclusions: These findings correlated closely with age. Farmers with less years of experience used a greater variety of sources and channels than farmers with many years of experience. To make sure that farmers with more years in farming are receiving information agricultural educators need to disseminate information through, daily newspapers.

Research Question 8: Does the gender have an effect on the use of sources or channels for gaining information on new agricultural practices by fruit and vegetable farmers in five selected counties of Southwest Michigan?

Hypothesis 7: There is a significant difference between male farmers and female farmers, with regard to the use of identified sources of information by fruit and vegetable farmers of Southwest Michigan, for new agricultural practices.

Hypothesis 8: There is a significant difference between male farmers and female farmers, with regard to the use of identified channels of information by fruit and vegetable farmers of Southwest Michigan, for new agricultural practices.

The analysis revealed significant differences in the use of sources and channels of agricultural information between and male farmers and female farmers with two of the twelve sources, and one of the eighteen channels.

Findings: 1. Male farmers used Local Sales People and Private Consultants significantly more than female farmers as sources of information to gain information on new agricultural practices.

2. Male farmers utilized Agriculture Trade Shows as a channel of information significantly more than female farmers for new agricultural practices.

Conclusions: There were significant differences between males and females in their use of two sources and one channel. Local Sale People, Private Consultants and Agriculture Trade Shows are used more by male farmers than female farmers.

Research Question 9: Does the type of farm ownership affect the use of sources or channels for gaining information on new agricultural practices used by fruit and vegetable farmers in five selected counties of Southwest Michigan?

Hypothesis 13: There is a significant difference between the types of farm ownership with regard to the use of identified sources of information by fruit and vegetable farmers of Southwest Michigan, for new agricultural practices.

Hypothesis 14: There is a significant difference between the types of farm ownership with regard to the use of the identified channels of information by fruit and vegetable farmers of Southwest Michigan, for new agricultural practices.

Analysis revealed that there were significant differences in the use of sources and channels of agricultural information between these types of farm ownership, owner operator, partnerships and corporations.

Findings:
1. Partnerships used Farmers Home Administration Personnel as a source of information significantly more than owner operators to gain information on new agricultural practices.
2. Partnerships and corporations utilized Agricultural Trade Shows as a channel of information for new agricultural practices, significantly more than owner operators, for new agricultural practices.
3. Partnerships utilized Telephone recordings as a channel of information, significantly more than Owner operators, as a channel of information for gaining information on new agricultural practices.
4. Corporate owned farm operations utilized Video Tape, significantly more frequently as a channel of information than owner operators, for new agricultural practices.

Conclusions: The more partners involved in the ownership of the farm the greater the use of Farmers Home Administration Personnel, attendance of Agriculture Trade Shows and the use of Telephone recordings as sources and channels.

Implications

Major implications were stated and discussed by the author concerning use of sources and channels of information by fruit and vegetable farmers of Southwest Michigan. The degree to which findings can be generalized exist to the population of which the random sample population was drawn.

Implication 1: When sources and channels were separated, county Cooperative Extension Service personnel ranked high as a source of information to clientele for fruit and vegetable information. As funding of programs becomes a serious problem, ways to keep agents current with up-to-date information, backed up by specialists able to assist county staff, must be continually reviewed.

Implication 2: Many Product Company representatives currently assist in delivery of information and are excellent sources to clientele. Product Company Representatives have access to funds from their companies that could be used by county Cooperative Extension Service personnel to disseminate information or to co-sponsor workshops, radio programs, field days and tours.

Implication 3: As disseminators of information agricultural educators need to utilize channels which clientele used. Farm magazines such as Michigan Farmer, Michigan Prairie Farmer, American Vegetable Grower, American Fruit Grower and monthly newsletters of Great Lakes Fruit Growers News and Great Lakes Vegetable Growers News were used as a source of information by clientele in Southwest Michigan. Cooperative Extension Service personnel need to write and submit articles to these channels. These are inexpensive ways of delivery information to clientele, providing both regional and statewide coverage.

Implication 4: Agricultural Bulletins were a vital and useful tool for delivering information to clientele. Michigan State University Cooperative Extension Service must continue to develop, update and provide agricultural bulletins as channels of information. The Agricultural Bulletins give farmers a technically concise document without bias of commercial sales. .

Implication 5: As new channels of information become available, such as Video Tape and Microcomputer Communications, as educators we must understand the saturation levels and which type of farmers are using these technologies. As video players and computers become common in homes and farms, agricultural educators must have the software and videos available for farm clientele to use.

Implication 6: Traditional delivery of information by channels must be reviewed by each agricultural educator to streamline delivery and reduce costs of having numerous expensive channels not used by farm clientele. With cost of postage increasing the use of newsletters created, printed and mailed by each educators office must be reviewed for readership.

Recommendations for Further Studies

As with any study many additional questions and objectives could have been specified. Listed below are six recommendations that were suggested for future research.

1. Throughout the research it was noted that "Other Sources" and "Other Channels" were used by fruit and vegetable farmers. Future studies could involve determining which other sources or channels of information farmers use to gain information on new agricultural practices.

2. The study was completed primarily on those farmers who were on Cooperative Extension Service mailing lists. A study could be accomplished to determine if there is a difference in the selection of sources or channels by farmers, who are not currently on mailing lists of the Cooperative Extension Service in the study area.

3. Other populations could be studied, such as field crop or livestock producers, to determine if they receive information from similar or different sources than fruit and vegetable farmers in the study area.

4. Conduct a study to determine if different regions of the state use sources or channels differently than Southwest Michigan.

5. Conduct a study to determine how the stages of adoption make a difference in the sources or channels of information used by farmers.

6. Conduct a study using non-traditional Cooperative Extension Service clientele or home owners as the population, to determine the use of sources and channels for information delivery.

Personal Observations

The following are personal observations by the author.

Observation 1: It is important that the Michigan State University Cooperative Extension Service continue to use field staff positions in the area of fruit and vegetables, to continue their mission of disseminating technical information to clientele of Southwest Michigan. It is also important that the Michigan State University Cooperative Extension Service and other agricultural educators continue to have a positive relationship with product company representatives, as they were a resource used by clientele. Many Product Company Representatives currently assist in delivery of information, and are

sources to clientele. Product Company Representatives have access to funds from their companies that could be used to disseminate information or to sponsor workshops, radio programs, field days and twilight tours with formal agricultural educators.

Disseminators of information must utilize channels which clientele use. Farm magazines, such as the Michigan Farmer, Michigan Prairie Farmers, American Vegetable Grower, American Fruit Grower and monthly newsletters of the Great Lakes Fruit Growers news and Great Lakes Vegetable Growers News were used as a source of information by clientele in Southwest Michigan. To reach farmers, agricultural educators should consider writing and submitting articles to these channels. These are inexpensive ways of delivery of information to clientele providing both regional and statewide coverage.

Some areas were not used as much as others. Agricultural educators should also consider trying newer channels of information, especially the use of Video Tape and Microcomputers. Standards should be recognized so as not to spend an inappropriate amount of money for software and videos that may become obsolete. Because of their basic practice of being classroom teachers of youth, the agricultural teacher's reputation may be a hindrance to fully develop their potential. They may consider selecting and building some type of specialty to gain respect from the farming community in which they work and live. They also may wish to teach adult education classes during the year and possibly work with county Cooperative Extension Service offices during the summer months to enhance their image.

Observation 2: Instructional videos that are available currently to farm producers may be priced higher than average or below average income farms may be able to afford. Also the video tape player may still be seen in households as a entertainment item and

high debts of lower income farms would prohibit the purchase of this item. Farms with higher income may have other family members involved in the farming operation.

Observation 3: Older farmers may not be making as many adjustments to their farming operations and do not need the details of information found in other sources or channels. Younger farmers may have video tape players in their homes for entertainment or have purchased them before their older counterparts. Younger farmers may have been exposed to the use of microcomputers through work off the farm, school or from a working spouse.

Observation 4: It was difficult to identify clientele by educational levels for delivery of information. Agricultural educators needed to know levels of education when writing and publishing reports, bulletins and newsletters. The results show that agricultural educators may write information and deliver information to clientele at high school level or greater. It is important they do not write or present information too simplistic or they may loose the attention of their particular audience.

Observation 5: Farmers with less years in farming most likely are younger farmers. To keep daily newspapers as a channel, agriculture educators may need to work with sponsors to keep their information in local papers. Many of the papers have cut their coverage to one page per week. Agricultural educators must know their local newspaper editors and make contact regularly.

Observations 6: Agricultural educators need to continually renew their information to exclude the possibility of gender bias, in delivery of agricultural information so that they do not alienate either sex. Local sales people and private consultants may have been predominately male. Agricultural trade shows are also staffed predominately by males. Their literature and sales delivery is written and presented to

a predominant male market-place.

Observation 7: Farmers in partnerships and corporations would need to purchase additional management through private consultants, as acreage and diversity increase, creating the need for assistance in areas of marketing, production practices and record keeping. Partnerships usually involve a father and son relationship requiring additional capital to allow the son to purchase his way into the operation. With additional risk and questionable outcomes from new arrangements, Farmers Home Administration had a history of loaning capital to these types of farms because of their lender of last resort policy. When farmers borrow money they also consulted with their lender, on approved practices for which capital could be used.

APPENDICES

APPENDIX A

APPENDIX A
Copy of the Survey Instrument

FARM INFORMATION SURVEY
SOUTHWEST MICHIGAN FRUIT AND VEGETABLE
on sources and channels for new agricultural practices

Please read all the questions thoroughly **before** you give an answer.

PART I.

Note: The questions in Part are asking you to rate how frequently you use direct **sources of information,** as well as **channels of information.** Please read the rating scale before answering each question.

1. Please circle the number that best describes how frequently you use each of the following sources of information for agricultural practices.

	Always Use	Usually Use	Sometimes Use	Seldom Use	Never Use
Agricultural Stabilization Conservation Personnel (ASCS)	4	3	2	1	0
County Cooperative Extension Agent (CES)	4	3	2	1	0
Farmers Home Administration Personnel (FmHA)	4	3	2	1	0
Farmers who are family members	4	3	2	1	0
Farmers who are not family members	4	3	2	1	0
Local sales people	4	3	2	1	0
Michigan State University Specialist (MSU)	4	3	2	1	0
Private Consultants	4	3	2	1	0
Product Company Representatives (fertilizer, chemical, seed etc.)	4	3	2	1	0
Soil Conservation Service Personnel (SCS)	4	3	2	1	0
Vocational Agriculture Teacher (Local High School)	4	3	2	1	0
Other	4	3	2	1	0

PART I. CONTINUED:

2. Please circle the number that best describes how frequently you use <u>each</u> of the following channels of information for agricultural practices.

	Always Use	Usually Use	Sometimes Use	Seldom Use	Never Use
Agricultural Bulletins (from Michigan State University and other universities)	4	3	2	1	0
Agricultural Newsletters (Agri-Talk, The Plowshare, Doanes, Pro-farmer, etc.)	4	3	2	1	0
Agricultural Trade shows (Horticulture Convention, Vegetable Growers Annual Meeting, etc.)	4	3	2	1	0
Daily newspapers	4	3	2	1	0
Demonstration plots or trials on farms	4	3	2	1	0
Direct mailings (letters)	4	3	2	1	0
Farm magazines (Michigan Farmer, American Vegetable Grower, American Fruit Grower and others)	4	3	2	1	0
Field Days and Twilight Tours	4	3	2	1	0
Microcomputer Communications (phone modem or diskettes)	4	3	2	1	0
Office visits to ASCS, CES, FmHA, SCS	4	3	2	1	0
Radio advertisements and programs	4	3	2	1	0
Television advertisements and programs	4	3	2	1	0
Telephone recordings (code-a-phone)	4	3	2	1	0
Using the telephone to contact ASCS, CES, FmHA, SCS	4	3	2	1	0
Video tape	4	3	2	1	0
Weekly or monthly Ag Newsletter (Great Lakes Fruit Grower, Farmers Advance, Great Lakes Vegetable Grower	4	3	2	1	0
Word of mouth from other farmers	4	3	2	1	0
Other	4	3	2	1	0

PART II.

Note: Part II. asks background and cross reference information related to the questions in Part I.

1. **Please state the number of acres that you own and/or rent for your fruit and vegetable production.**

_____ Acres Owned

_____ Acres Rented

2. **Please put an (x) by the appropriate category for the number of days you worked off-the-farm last year.**

_____ No off-the-farm work

_____ Less than 100 days of off-the-farm work

_____ More than 100 days of off-the-farm work

3. **Please state your current age.**

_____ years old

4. **Please put an (x) by the appropriate category which best describes your <u>formal</u> education.**

_____ less than high school diploma or equivalent
_____ high school diploma or equivalent
_____ two year college degree (any kind)
_____ four year college degree or more (any kind)

5. **Please state the number of years you have been farming.**

_____ years in farming

PART II. CONTINUED:

6. **Please indicate your sex with an (x).**

_____ Male
_____ Female

7. **Please put an (x) by the type of farm ownership.**

_____ Owner operator
_____ Partnership
_____ Corporation

8. **Please put an (x) by the appropriate range of gross dollar earnings from your fruit and vegetable operations as averaged over the past 5 years.**

_____ less than $5,000
_____ $5,001 to $10,000
_____ $10,001 to $25,000
_____ $25,001 to $50,000
_____ $50,001 to $100,000
_____ $100,001 to $250,000
_____ greater than $250,000

Thank you for completing this survey.
Please return in the envelope provided.
Don't forget to also return the enclosed postcard at the same time.

APPENDIX B

APPENDIX B
Sample of First Cover Letter

June 14, 1990

1~
2~
3~

Dear 4~:

In order to better serve you, the clientele of the Cooperative Extension Service, the Extension agents in Southwest Michigan are in the process of determining what sources and channels fruit and vegetable farmers use to gain information on farming practices. A survey instrument has been developed. You are one of a few farmers that have been selected to help by providing your input.

Your responses to the questionnaire will be very beneficial in determining how agricultural information will be dispersed in the future, and will allow us to formulate plans to meet your information needs.

The survey takes approximately seven minutes to complete. Please answer all the questions. The questionnaire should be answered by the person who is most involved in making decisions about the farming operation.

Enclosed are three items, one survey, one pre-addressed and pre-stamped envelope and one pre-addressed and pre-stamped postcard. Please put the completed survey into the envelope and mail both the survey and the postcard at the same time. We would appreciate receiving the completed survey within the next five days.

All responses are confidential and no personal information is being recorded. We need the farmer and farm data to help us define the difference in needs of farmers of all types. You indicate your voluntary agreement to participate by completing and returning this questionnaire.

We thank you very much for your time and trouble in completing the enclosed questions. If you have any questions about the survey please contact Pete Vergot at 657-5564.

Sincerely yours,

Pete Vergot, III
County Extension Director
Van Buren County

T. Mike Thomas
District Extension
Horticulture & Marketing
Agent

jp

Enclosure

APPENDIX C

APPENDIX C
Sample of Return Postcards

No____

Thank you for your input.

Please mail this postcard when you mail your questionnaire.

Thank you.

Pete Vergot, III
County Extension Director
Van Buren County
657-5564

No. 2____

Thank you for your input.

Please mail this postcard when you mail your questionnaire.

Thank you.

Pete Vergot, III
County Extension Director
Van Buren County
657-5564

APPENDIX D

APPENDIX D
Sample of Second Cover Letter

June 28, 1990

1~
2~
3~

Dear 4~:

At the present time we have not received your survey. We have enclosed another one for you if you have misplaced or forgotten the first one. You are one of a few farmers that have been selected to help by providing your input. In order to better serve you, the clientele of the Cooperative Extension Service, the Extension agents in Southwest Michigan are in the process of determining what **sources** and **channels** fruit and vegetable farmers use to gain information on farming practices. A survey instrument has been developed.

Your responses to the questionnaire will be very beneficial in determining how agricultural information will be dispersed in the future, and will allow us to formulate plans to meet **your** information needs.

The survey takes approximately seven minutes to complete. Please answer all the questions. The questionnaire should be answered by the person who is most involved in making decisions about the farming operation.

Enclosed are three items, one survey, one pre-addressed and pre-stamped envelope and one pre-addressed and pre-stamped postcard. Please put the completed survey into the envelope and mail both the survey and the postcard at the same time. We would appreciate receiving the completed survey within the next five days.

All responses are confidential and no personal information is being recorded. We need the farmer and farm data to help us define the difference in needs of farmers of all types. You indicate your voluntary agreement to participate by completing and returning this questionnaire.

We thank you very much for your time and trouble in completing the enclosed questions. If you have any questions about the survey please contact Pete Vergot at 657-5564.

If you have filled out and mailed back the survey along with the postcard please disregard this letter.

Sincerely yours,

Pete Vergot, III
County Extension Director
Van Buren County

T. Mike Thomas
District Extension
Horticulture & Marketing
Agent

jp

Enclosures

APPENDIX E

APPENDIX E
Sample of Postcard Reminder

Dear :

July 16, 1990

It is very important to us that we receive your comments regarding the Farm Information Survey for Southwest Michigan Fruit and Vegetables on sources and channels for new agricultural practices.

Please take a few minutes to complete the questionnaire and return it in the envelope previously provided.

If you need an additional survey or have a question please call, 657-5564.

Sincerely,

Pete Vergot, III
County Extension Director
Van Buren County

jp

APPENDIX F

APPENDIX F

SURVEY AND POSTCARD RETURNS

	Surveys Received		Postcards Received
	Complete	Incomplete	
June			
18	28		24
19	31		30
20	12	1	10
21	10	1	8
22	11	2	14
25	18	2	18
26	7		8
27	3		1
28	3		3
29	2		4
July			
2	21	2	19
3	15	3	16
5	8	1	10
6	8	1	6
9	6	2	7
10	1		1
12	4		2
13	2		2
16	0		1
17	3		3
18	1		2
Total	195	15	187

APPENDIX G

APPENDIX G

Reasons Why People Did Not Fill Out Survey

1. I retired in 1988 I have leased the farm out.
2. I am not a grower I sell produce but never grow it.
3. We no longer raise fruit and vegetables, we are totally grain and cattle and sunflowers, however a good survey.
4. I am no longer farming, please take me off the mailing list.
5. I have not farmed for years, my input would not be helpful to you.
6. Most of the farm was sold in 1987, I'm only farming about 5 acres.
7. We not longer have fruits and vegetables.
8. My farm is rented out, I'm not farming anymore.
9. I no longer farm having sold our farm in 1987. I was a farmer for 55 years.
10. Our son took over the farm.
11. My husband passed away June 15, we aren't farming this year.
12. To my knowledge Randy Wetzel does not live at this address.
13. Not farming anymore.
14. I have too small of a farm to be included.
15. We sold our farm last year.
16. Please be advised that I'm not actively engaged in farming at the present time and cannot complete this survey.

APPENDIX H

APPENDIX H

TABLE 23. Results of t-test Analysis of Respondents Versus Non-Respondents

Selected Characteristics	Respondent Mean	Non Respondent Mean	t-value	Two-tail Prob.
Current Age of Respondents	54	51	.93	.356
Number of Years in Farming	29	31	-.53	.600
Total Acres farmed	198	177	.11	.913
Acres owned	177	146	.16	.871
Acres rented	72	98	-.25	.806

***Significant at the less than .05 level**

APPENDIX I

APPENDIX I

Table 24. ANOVA Means and Standard Deviations Between Sources of Information and Levels of Formal Education

Sources of Information	Level of Formal Education: Less Than High School Diploma Mean S.D. (Number)	High School Diploma Mean S.D. (Number)	Two Year Degree Mean S.D. (Number)	Four Year Degree or More Mean S.D. (Number)
Agricultural Stabilization Conservation Service Personnel	1.38 1.22 (18)	1.73 1.15 (94)	2.04 1.13 (25)	1.40 1.20 (44)
Cooperative Extension Service Personnel	2.15 1.08 (20)	2.17 1.06 (93)	2.46 .81 (26)	2.47 1.30 (44)
Farmers Home Administrative Personnel	.50 .65 (14)	.45 .71 (91)	.66 1.09 (24)	.63 1.03 (44)
Farmers who are family members	1.55 1.57 (20)	1.83 1.32 (92)	1.80 1.15 (25)	2.00 1.39 (42)
Farmers who are not family members	1.70 1.12 (20)	1.69 1.09 (92)	1.76 1.05 (25)	2.22 1.14 (45)
Local Sales People	1.40 1.18 (15)	1.70 .98 (92)	2.15 1.04 (26)	1.79 1.01 (43)
Michigan State University Specialist	1.44 1.04 (18)	1.60 1.20 (92)	1.72 .93 (25)	1.72 1.20 (44)
Private Consultants	.58 1.06 (17)	1.14 1.34 (92)	1.20 1.38 (24)	1.47 1.60 (44)
Product Company Representatives	1.88 1.13 (18)	2.10 1.13 (93)	2.48 1.08 (25)	1.88 1.27 (44)
Soil Conservation Service Personnel	1.20 1.15 (20)	1.21 1.05 (92)	1.60 1.08 (25)	1.32 1.20 (43)
Vocational Agriculture Teachers	.05 .24 (17)	.22 .51 (93)	.12 .33 (24)	.34 .71 (44)
Other Sources	.38 .76 (13)	.74 1.01 (75)	.88 1.05 (17)	1.30 1.23 (33)

APPENDIX J

APPENDIX J

Table 25. ANOVA Means and Standard Deviations Between Channels of Information and Levels of Formal Education

	Level of Formal Education			
	Less Than High School Diploma	High School Diploma	Two Year Degree	Four Year Degree or More
Channels of Information	Mean S.D. (Number)	Mean S.D. (Number)	Mean S.D. (Number)	Mean S.D. (Number)
Agricultural Bulletins by Michigan State and other Universities	2.47 1.07 (19)	2.45 .94 (94)	2.38 .80 (26)	2.62 .87 (43)
Agricultural Newsletters	1.16 .98 (18)	1.78 1.18 (93)	1.92 1.32 (25)	1.72 1.07 (43)
Agricultural Trade Shows	.88 .99 (17)	1.93 1.30 (93)	2.04 1.12 (24)	2.16 1.21 (43)
Daily Newspapers	2.09 1.44 (21)	2.13 1.24 (94)	2.30 .88 (26)	2.04 1.10 (42)
Demonstration Plots or Trials on Farms	1.15 1.11 (19)	1.58 .95 (93)	1.68 .94 (25)	1.32 1.06 (43)
Direct Mailings	2.25 1.40 (20)	2.06 1.16 (91)	2.04 .97 (25)	2.09 1.15 (44)
Farm Magazines	2.21 1.47 (19)	2.62 1.09 (94)	2.57 1.17 (26)	2.56 1.12 (44)
Field Days and Twilight Tours	1.00 .90 (18)	1.35 1.05 (93)	1.32 .94 (25)	1.41 .95 (43)
Microcomputer Communications	.27 .75 (18)	.41 .82 (93)	.68 .90 (25)	.53 1.00 (43)

Table 25 (cont'd)

Channels of Information	Level of Formal Education			
	Less Than High School Diploma	High School Diploma	Two Year Degree	Four Year Degree or More
	Mean S.D. (Number)	Mean S.D. (Number)	Mean S.D. (Number)	Mean S.D. (Number)
Office Visits to ASCS, CES, FmHA and SCS	1.36 1.11 (19)	1.67 1.04 (92)	2.20 1.19 (25)	1.48 1.09 (43)
Radio Advertisements and programs	1.35 1.13 (20)	1.60 1.24 (93)	1.44 .82 (25)	1.20 1.05 (43)
Television Advertisements and programs	.95 .94 (20)	1.07 1.03 (93)	1.28 .73 (25)	.76 .81 (43)
Telephone Recordings	1.00 1.17 (17)	1.00 1.19 (91)	1.52 1.38 (25)	.90 1.19 (43)
Using the Telephone to contact ASCS, CES, FmHA and SCS	1.45 1.50 (20)	1.85 1.17 (92)	2.53 1.30 (26)	2.20 1.28 (93)
Video Tape	.06 .25 (16)	.52 .73 (92)	.88 1.12 (25)	.44 .73 (43)
Weekly or Monthly Agricultural Newsletters	1.68 1.33 (19)	2.39 1.30 (91)	2.72 .93 (25)	2.40 1.22 (44)
Word of Mouth from other farmers	2.00 1.16 (20)	2.36 .91 (93)	2.48 .87 (25)	2.46 .88 (43)
Other Channels	1.23 1.30 (13)	1.04 1.05 (66)	1.11 1.26 (17)	1.28 .93 (25)

APPENDIX K

APPENDIX K

Table 26. ANOVA Means and Standard Deviations Between Sources of Information and Types of Farm Ownership

Sources of Information	Types of Farm Ownership: Owner Operators Mean S.D. (Number)	Partnerships Mean S.D. (Number)	Corporation Mean S.D. (Number)
Agricultural Stabilization Conservation Service Personnel	1.66 1.22 (141)	1.88 1.12 (25)	1.66 1.15 (12)
Cooperative Extension Service Personnel	2.26 1.02 (142)	2.40 1.08 (25)	2.53 1.05 (13)
Farmers Home Administration Personnel	.44 .76 (134)	1.08 1.25 (25)	.58 .66 (12)
Farmers who are family members	1.73 1.39 (139)	2.40 .95 (25)	2.15 .98 (13)
Farmers who are not family members	1.82 1.12 (141)	2.04 .99 (24)	1.92 1.07 (14)
Local Sales People	1.76 1.02 (136)	1.84 1.10 (25)	2.76 .86 (13)
Michigan State University Specialists	1.52 1.13 (138)	2.00 1.00 (25)	2.30 1.03 (13)
Private Consultants	1.00 1.32 (137)	1.70 1.65 (24)	1.92 1.11 (13)
Product Company Representatives	2.01 1.19 (139)	2.32 1.18 (25)	2.38 .86 (13)
Soil Conservation Service Personnel	1.27 1.10 (140)	1.52 1.19 (25)	1.23 .83 (13)
Vocational Agriculture Teachers	.20 .52 (138)	.33 .63 (24)	.30 .48 (13)
Other Sources	.72 1.02 (105)	1.44 1.14 (18)	1.18 .87 (11)

APPENDIX L

APPENDIX L

Table 27. ANOVA Means and Standard Deviations Between Channels of Information and Types of Farm Ownership

	Types of Farm Ownership		
	Owner Operators	Partnerships	Corporation
Channels of Information	Mean S.D. (Number)	Mean S.D. (Number)	Mean S.D. (Number)
Agricultural Bulletins from Michigan State University and other Universities	2.48 .95 (142)	2.60 .76 (25)	2.23 .83 (13)
Agricultural Newsletters	1.68 1.16 (138)	1.96 1.20 (25)	2.07 1.03 (13)
Agricultural Trade Shows	1.69 1.25 (136)	2.52 1.15 (25)	2.61 .86 (13)
Daily Newspapers	2.14 1.17 (142)	2.28 1.20 (25)	2.00 1.15 (13)
Demonstration Plots and Trial on Farms	1.40 1.04 (139)	1.76 .87 (25)	1.92 .49 (13)
Direct Mailings	2.11 1.21 (138)	2.00 .86 (25)	2.07 1.07 (14)
Farm Magazines	2.46 1.19 (141)	2.96 .88 (25)	2.78 .89 (14)
Field Days and Twilight Tours	1.23 .99 (138)	1.60 .86 (25)	1.76 .92 (13)
Microcomputer Communications	.45 .90 (130)	.44 .65 (25)	.76 1.01 (13)

Table 27 (cont'd)

Channels of Information	Types of Farm Ownership: Owner Operators Mean S.D. (Number)	Partnerships Mean S.D. (Number)	Corporation Mean S.D. (Number)
Office Visits to ASCS, CES, FmHA and SCS	1.69 1.08 (139)	1.84 1.21 (25)	1.61 1.19 (13)
Radio Advertisements and programs	1.46 1.15 (141)	1.60 1.22 (25)	1.53 1.19 (13)
Television Advertisements and programs	1.03 .97 (141)	.96 .88 (25)	1.46 1.19 (13)
Telephone Recordings	.97 1.23 (135)	1.76 1.30 (25)	1.07 .86 (13)
Using the Telephone to Contact ASCS, CES, FmHA and SCS	1.95 1.28 (140)	2.40 1.15 (25)	2.23 1.16 (13)
Video Tape	.44 .75 (136)	.62 .71 (24)	1.07 1.11 (13)
Weekly or Monthly Newsletters	2.30 1.28 (137)	2.76 2.42 (25)	1.23 .75 (14)
Word of Mouth from other farmers	2.33 .92 (139)	2.72 .79 (25)	2.21 .89 (14)
Other Channels	.093 1.03 (89)	1.68 1.05 (19)	1.55 .52 (9)

APPENDIX M

APPENDIX M

Table 28. ANOVA Means and Standard Deviations Between Sources of Information and Gross Farm Income

	Gross Farm Income						
	<$5,000	**$5,001 to $10,000**	**$10,001 to $25,000**	**$25,001 to $50,000**	**$50,001 to $100,000**	**$100,001 to $250,000**	**Greater than $250,000**
Sources of Information	**Mean S.D. (Number)**	**Mean S.D. (Number)**	**Mean S.D. (Number)**	**Mean S.D. (Number)**	**Mean S.D. (Number)**	**Mean S.D. (Number)**	**Mean S.D. (Number)**
Agricultural Stabilization Conservation Personnel	1.28 1.22 (32)	1.55 1.42 (18)	1.45 1.18 (32)	1.57 1.12 (19)	1.84 1.12 (26)	2.00 1.16 (23)	1.83 .98 (18)
Cooperative Extension Service Personnel	1.96 1.09 (32)	2.31 1.05 (19)	2.15 1.16 (32)	2.36 1.38 (19)	2.15 1.08 (26)	2.41 .58 (24)	2.72 .75 (18)
Farmers Home Administration Personnel	.46 .86 (30)	.25 .44 (16)	.61 .91 (31)	.22 .73 (18)	.69 1.01 (26)	.78 .95 (23)	.61 .91 (18)
Farmers who are family members	1.51 1.20 (31)	2.15 1.38 (19)	1.12 1.31 (32)	1.42 1.26 (19)	2.42 1.27 (26)	2.50 1.01 (22)	2.16 1.24 (18)
Farmers who are not family members	1.40 1.21 (32)	1.94 1.12 (19)	1.53 1.10 (32)	2.00 1.02 (20)	1.83 .96 (24)	2.12 1.22 (04)	2.05 .93 (18)
Local Sales People	1.67 1.10 (31)	1.50 1.15 (18)	1.65 1.18 (32)	1.83 1.09 (18)	1.80 .84 (26)	2.17 .77 (23)	2.05 .87 (18)
Michigan State University Specialists	1.16 1.18 (31)	1.38 1.14 (18)	1.37 1.00 (32)	1.31 1.10 (19)	2.15 1.18 (26)	2.04 .70 (23)	2.27 .82 (18)

Table 28 (cont'd)

Sources of Information	Gross Farm Income						
	<$5,000	$5,001 to $10,000	$10,001 to $25,000	$25,001 to $50,000	$50,001 to $100,000	$100,001 to $250,000	Greater than $250,000
	Mean S.D. (Number)	Mean S.D. (Number)	Mean S.D. (Number)	Mean S.D. (Number)	Mean S.D. (Number)	Mean S.D. (Number)	Mean S.D. (Number)
Private Consultants	.64 1.11 (312)	.56 1.15 (16)	1.09 1.30 (32)	1.31 1.30 (19)	1.24 1.50 (25)	1.75 1.53 (24)	2.11 1.49 (18)
Product Company Representatives	1.74 1.29 (31)	2.23 1.48 (16)	2.12 1.26 (32)	2.05 1.07 (19)	2.03 1.21 (26)	2.25 .79 (24)	2.38 1.03 (18)
Soil Conservation Service Personnel	1.06 1.09 (31)	1.10 1.14 (19)	.90 1.14 (32)	1.47 .96 (19)	1.42 1.13 (26)	1.69 .82 (23)	1.22 .87 (18)
Vocational Agriculture Teachers	.32 .70 (31)	.05 .24 (17)	.21 .60 (32)	.15 .50 (19)	.28 .54 (25)	.29 .46 (24)	.055 .23 (18)
Other Sources	.53 1.10 (26)	.30 .75 (13)	.73 1.11 (26)	.92 .95 (13)	.60 1.12 (15)	1.31 .88 (19)	1.60 .73 (15)

APPENDIX N

APPENDIX N

Table 29. ANOVA Means and Standard Deviations Between Channels of Information and Gross Farm Income

Channels of Information (Number)	Gross Farm Income						
	<$5,000	$5,001 to $10,000	$10,001 to $25,000	$25,001 to $50,000	$50,001 to $100,000	$100,001 to $250,000	Greater than $250,000
	Mean S.D. (Number)	Mean S.D. (Number)	Mean S.D. (Number)	Mean S.D. (Number)	Mean S.D. (Number)	Mean S.D. (Number)	Mean S.D.
Agriculture Bulletins from Michigan State University and other Universities	2.32 1.07 (31)	2.44 1.09 (18)	2.31 .82 (32)	2.40 1.14 (20)	2.69 1.01 (26)	2.62 .71 (24)	2.61 .69 (18)
Agricultural Newsletters	1.70 1.17 (30)	1.33 1.13 (18)	1.59 1.21 (32)	1.75 1.20 (20)	1.92 1.16 (26)	1.87 1.11 (24)	2.16 1.15 (18)
Agriculture Trade Shows	1.43 1.33 (30)	1.00 1.11 (17)	1.71 1.32 (22)	1.70 2.12 (20)	2.15 1.15 (26)	2.54 .83 (24)	3.05 .80 (18)
Daily Newspapers	2.37 1.18 (32)	1.68 1.20 (19)	2.09 1.30 (31)	2.20 1.00 (20)	2.07 1.19 (26)	2.04 .99 (24)	2.22 1.26 (18)
Demonstration Plots and Trials on farms	1.19 .98 (31)	1.33 1.08 (18)	1.25 .99 (31)	1.35 .93 (20)	1.65 .97 (26)	1.91 .88 (24)	1.72 .66 (18)
Direct Mailings	1.76 1.30 (30)	2.05 1.25 (18)	2.16 1.03 (31)	2.38 1.43 (21)	2.20 1.15 (25)	2.33 .70 (24)	1.83 1.04 (18)
Farm Magazines	2.00 1.34 (32)	2.27 1.12 (18)	2.75 1.04 (32)	2.71 1.10 (21)	2.61 1.20 (26)	2.79 .88 (24)	2.94 .87 (18)

Table 29 (cont'd)

Channels of Information	Gross Farm Income						
	<$5,000	$5,001 to $10,000	$10,001 to $25,000	$25,001 to $50,000	$50,001 to $100,000	$100,001 to $250,000	Greater than $250,000
	Mean S.D. (Number)	Mean S.D. (Number)	Mean S.D. (Number)	Mean S.D. (Number)	Mean S.D. (Number)	Mean S.D. (Number)	Mean S.D. (Number)
Field Days and Twilight Tours	1.06 1.01 (20)	.70 .77 (17)	1.50 1.07 (32)	.90 .85 (20)	1.42 .94 (26)	1.83 .86 (24)	1.77 .73 (18)
Microcomputer Communications	.23 .77 (30)	.23 .43 (17)	.40 .75 (32)	.35 .67 (20)	.76 1.24 (26)	.50 .72 (24)	.66 .97 (18)
Office Visits to ASCS, CES, FmHA FmHA and SCS	1.26 1.17 (30)	1.72 1.22 (18)	1.56 .98 (32)	1.55 1.09 (20)	1.69 1.19 (26)	2.04 .95 (24)	1.72 1.01 (18)
Radio Advertisements and programs	1.51 1.43 (31)	1.21 1.18 (19)	1.53 1.10 (32)	1.50 1.31 (20)	1.42 1.17 (26)	1.79 .97 (24)	1.11 .96 (18)
Television Advertisements and programs	1.22 1.28 (31)	.72 1.12 (18)	.87 .79 (32)	.95 .94 (20)	1.07 .89 (26)	1.16 1.00 (24)	.83 .61 (18)
Telephone Recordings	.63 1.21 (30)	.93 1.43 (16)	1.48 1.36 (31)	1.40 1.39 (20)	.92 1.09 (26)	1.16 1.12 (24)	1.16 .98 (18)
Using the Telephone to Contact the ASCS, CES, FmHA and SCS	1.45 1.09 (31)	2.00 1.37 (18)	2.00 1.24 (32)	1.75 1.55 (20)	2.08 1.22 (25)	2.58 .97 (24)	2.50 1.24 (18)
Video Tape	.20 .61 (30)	.23 .56 (17)	.50 .80 (32)	.40 .68 (20)	.69 .83 (26)	.83 .96 (24)	.93 .92 (16)
Weekly or Monthly Agriculture Newsletters	1.70 1.36 (30)	1.76 1.30 (17)	2.53 1.21 (32)	2.61 1.07 (21)	2.46 1.17 (26)	2.91 .88 (24)	3.22 .94 (18)

Table 29 (cont'd)

Channels of Information (Number)	Gross Farm Income						
	<$5,000	$5,001 to $10,000	$10,001 to $25,000	$25,001 to $50,000	$50,001 to $100,000	$100,001 to $250,000	Greater than $250,000
	Mean S.D. (Number)	Mean S.D. (Number)	Mean S.D. (Number)	Mean S.D. (Number)	Mean S.D. (Number)	Mean S.D. (Number)	Mean S.D.
Word of Mouth from other farmers	2.00 .94 (30)	2.15 .89 (19)	2.22 .80 (31)	2.38 .86 (21)	2.56 1.04 (25)	2.70 .90 (24)	2.61 .97 (18)
Other Channels	.50 .80 (22)	.54 .93 (11)	1.22 1.26 (22)	1.33 1.04 (15)	1.23 1.09 (17)	1.30 .75 (13)	1.75 .86 (12)

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