

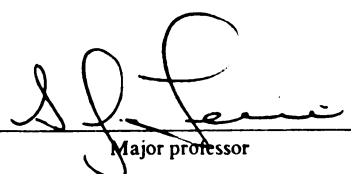


This is to certify that the
dissertation entitled
Sources and Channels of Information
Used By
Christmas Tree Growers in Michigan
presented by

Krishna Mohan Shrestha

has been accepted towards fulfillment
of the requirements for

M. S. degree in Agricultural and
Extension Education



Major professor

Date Jan. 2, 1996

LIBRARY Michigan State University

PLACE IN RETURN BOX to remove this checkout from your record.
TO AVOID FINES return on or before date due.

DATE DUE	DATE DUE	DATE DUE
NOV 28 1999		

MSU is An Affirmative Action/Equal Opportunity Institution

c:\circ\datedue.pm3-p.1

**SOURCES AND CHANNELS OF INFORMATION USED BY
CHRISTMAS TREE GROWERS IN MICHIGAN**

By

Krishna Mohan Shrestha

A THESIS

**Submitted to
Michigan State University
in partial fulfillment of the requirements
for the degree of**

MASTER OF SCIENCE

Department of Agricultural and Extension Education

1995

ABSTRACT

SOURCES AND CHANNELS OF INFORMATION USED BY CHRISTMAS TREE GROWERS IN MICHIGAN

By

Krishna Mohan Shrestha

This study was conducted to identify, describe, and document the Sources and Channels of Information used and preferred by the Christmas tree growers in Michigan. Specific research questions guided to develop instrument for this study. A mail survey questionnaire method was used to conduct this study. A sample size of 265 was drawn systematically with random start. Data were analyzed by using descriptive and inferential statistics.

Findings revealed that friends/neighbors/relatives, and the Natural Resource Conservation Service (NRCS) were the most and the least consulted Sources of Information by which respondents received information about Christmas tree farming, respectively. The Michigan Christmas Tree Association (MCTA), pesticide companies, and the Michigan State University Extension (MSUE) were perceived as the most useful Sources of Information. The respondents used and perceived the traditional Channels -- journals, magazines, newspapers, and bulletins-- as the most useful Channels of Information. Mass media-- radio, television, and computer--were the least used and

preferred Channels of Information. Significant differences were observed in Sources and Channels of Information used according to farm type, income, and membership.

This study concludes that respondents prefer to receive information from less formal Sources and traditional Channels of Information. Respondents' inclination is more toward the organization which directly deals with production and promotion of Christmas trees. Membership of the MCTA is an important variable in use of Source and Channels of Information. It is recommended that extension organizations provide Christmas tree farming information in less formal ways. Timely publication of journals, magazines, bulletins, and newspapers which address the practical problems of Christmas tree growers is recommended.

ACKNOWLEDGMENTS

Many people deserve credits in one way or the other for the successful completion of this study. The first and foremost, I would like to express my sincere gratitude and appreciation to Dr. S. Joe Levine, my “Guru”, and major professor, for sacrificing much of his time and bringing this study in this shape. His constant guidance and supervision helped me finish my study within a time frame set by USAID Nepal. I am also deeply grateful to other members of my committee: Dr. Michael Gold, and Dr. Murari Suvedi for their valuable suggestions and encouragement to have Plan A option for the partial fulfillment of the requirements for the Master of Science degree in Extension Education. Dr. Murari Suvedi also deserves special thanks for facilitating my admission process at the Department of Agricultural and Extension Education, MSU. I gratefully acknowledge the Christmas tree growers who participated in this study by sharing their experiences and perceptions on Christmas tree farming.

I express my gratitude to Dr. Melvin Koelling, Professor, Forestry Department, MSU, and the advisor of the Michigan Christmas Tree Association, for writing cover letter in this study and sharing insights on issues of Christmas tree farming in Michigan. Mrs. Laurie Koelling, Executive Director of the MCTA, deserves the credit for

providing list of Christmas tree growers and related journals to my study. Appreciation is equally due to Rajagopal Sitaraman, Nursery Program Manager, Michigan Department of Agriculture, for providing additional list of Christmas tree growers including printed mailing labels. My gratitude is also extended to Dr. Kirk Heinze, Professor, Dept. of AEE, MSU, for providing me the latest information related to my study. Dr. John "Frank" Bobbitt deserves special thanks for being source of reference for statistical analysis of this study.

I am grateful to Dr. O. Donald Meaders, Professor Emeritus, Dept. of AEE, for his effort on editing my paper thoroughly. The author would like to thank Mr. Tom Stadt, former president of the MCTA, and Mr. Greg Kowalewski, Forester at Kellogg Biological Station, MSU, for inviting me to attend 1994 MCTA Summer Meeting held in Ludington, Michigan, which indeed was the initial conception of this study.

I would like to extend my sincere appreciation to Mr. T. B. Karki, Dean, Institute of Forestry, Tribhuvan University, Nepal, for his dedication to the development of faculty strength at the Institute. I am indebted to Dr. A. L. Hammett, III, the then Chief of Party, Institute of Forestry Project, USAID Nepal, and other project staff for constantly facilitating the process of admission at MSU. My study at MSU would be impossible, if the USAID, Nepal, had not supported me.

Finally, I appreciate patience, and moral support of my wife, Kalpana, son, Ashish Shrestha, and my parents at home, for the successful completion of this study.

TABLE OF CONTENTS

LIST OF TABLES	viii
LIST OF FIGURES	xi
INTRODUCTION	1
General Background	1
Christmas Tree Industries and their Current Issues in Michigan ---	4
Statement of the Problem	5
Purpose of the Study	5
Research Questions	5
Significance of the Study	7
Operational Definitions	7
Limitations of the Study	9
REVIEW OF LITERATURE	10
Introduction	10
Conceptual Framework	11
Extension Approaches	12
Synthesis of Relevant Research to the Proposed Area of Study	14
METHODOLOGY	19
Study Method	19
Study Population, Sampling Method and Sample Size	19
Instrumentation of the Study	20
Handling Nonresponse Error	21
Data Analysis and Interpretation	21
FINDINGS	24
Organization of the Findings	24
General Description of the Respondents	24
Use of Sources of Information	30

Use of Channels of Information	32
Perceptions about Usefulness of Sources of Information	34
Perceptions about Usefulness of Channels of Information	36
Preferred Sources of Information	38
Preferred Channels of Information	39
Relationship between Demographic Characteristics and Frequency of Use of Sources of Information	41
Relationship between Demographic Characteristics and Frequency of Use of Channels of Information	42
Variation in Use of Sources of Information and Demographic Characteristics of Respondents	44
Variation in Use of Channels of Information and Demographic Characteristics of the Respondents	47
Difference between Christmas tree Growers with Farm Size Less than 15 Acres and More than 300 acres for Use of Sources of Information	50
Difference between Member and Nonmember Farmers of the MCTA for Use of Sources of Information	52
Difference between Member and Nonmember Farmers of the MCTA for Use of Channels of Information	53
Difference between Member and Nonmember Farmers of the MCTA for Change in Size of Christmas Tree Farm Operation During the Last Ten Years	55
Difference between Member and Nonmember Farmers of the MCTA for Awareness of Michigan Snowfresh Program ---	56
SUMMARY, CONCLUSIONS AND RECOMMENDATIONS	58
Summary	58
Conclusions and Recommendations	67
BIBLIOGRAPHY	71
APPENDICES	
Appendix A. Approval Letter from University Committee on Research Involving Human Subjects (UCRIHS)	74
Appendix B. Survey Instrument	75
Appendix C. Cover Letter	80
Appendix D. Reminder Letter	81
Appendix E. Results of ANOVA for Demographic Characteristics and Use of Sources of Information	82
Appendix F. Results of ANOVA for Demographics Characteristics and Use of Channels of Information	91

LIST OF TABLES

Tables	Page
Table 1. Distribution of Respondents by Age -----	24
Table 2. Distribution of Respondents by Education Level -----	25
Table 3. Distribution of Respondents by Gross Annual Income -----	26
Table 4. Distribution of Respondents by Number of Years of Christmas Tree Farming -----	26
Table 5. Distribution of Respondents by Type of Christmas Tree Farm ---	29
Table 6. Distribution of Respondents by Change in Size of the Christmas Tree Farm Operation -----	29
Table 7. Distribution of Respondents by Type of Farm Ownership -----	30
Table 8. Use of Sources of Information -----	31
Table 9. Use of Sources of Information by Number of Contacts per Year --	32
Table 10. Use of Channels of Information -----	33
Table 11. Respondents' Familiarity with Sources of Information -----	34
Table 12. Perceived Usefulness of Sources of Information -----	35
Table 13. Respondents' Familiarity with the Channels of Information -----	36
Table 14. Perceived Usefulness of Channels of Information -----	37
Table 15. Preferred Sources of Information for Different Aspects of Christmas Tree Farming -----	39

Table 16.	Preferred Channels of Information for Different Aspects of Christmas Tree Farming - - - - -	40
Table 17.	Relationship between Use of Sources of Information and Age, Farm Size and Number of Years in Christmas Tree Farming -	42
Table 18.	Relationship between Use of Channels of Information and Age, Farm Size and Number of Years in Christmas Tree Farming -	43
Table 19.	One-Way Analysis of Variance for Type of Farm and Use of Pesticide Companies - - - - -	44
Table 20.	Use of Pesticide Companies by Type of Farm - - - - -	45
Table 21.	One-Way Analysis of Variance for Type of Farm and Use of Friends/Neighbors/Relatives - - - - -	46
Table 22.	Use of Friends/Neighbors/Relatives by Type of Farm - - - - -	47
Table 23.	One-Way Analysis of Variance for Gross Annual Income and Use of Meetings/Seminars/Workshops - - - - -	48
Table 24.	Use of Meetings/Seminars/Workshops by Gross Annual Income of Respondents - - - - -	48
Table 25.	One-Way Analysis of Variance for Gross Annual Income and Use of Exhibitions/Demonstrations - - - - -	49
Table 26.	Use of Exhibitions and Demonstrations by Gross Annual Income of Respondents - - - - -	49
Table 27.	Results of t-test for Difference between Christmas tree Growers with Farm Size less than 15 acres and more than 300 acres for Use of Sources of Information - - - - -	51
Table 28.	Results of t-test for Difference between Member and Nonmember Farmer Use of Sources of Information - - - - -	53
Table 29.	Results of t-test for Difference between Member and Nonmember Farmer Use of Channels of Information - - - - -	54

Table 30.	Result of Chi-Square test for Difference between Members and Nonmembers of the MCTA for Change in Size of Christmas Tree Farm Operation During the Last Ten Years- - - - -	55
Table 31.	Result of Chi-Square test for Difference between Members and Nonmembers of the MCTA for Awareness of the Michigan Snowfresh Program - - - - -	56
Table 32.	Cross tabulation of the Membership Status of the MCTA by Change in Size of Christmas Tree Operation During the Last Ten Years - - - - -	57
Table 33.	Cross tabulation of the Membership of the MCTA by Awareness of the Michigan Snowfresh Program - - - - -	57

LIST OF FIGURES

Figures		Page
Figure 1.	Distribution of Respondents by Membership Status of the Michigan Christmas Tree Association - - - - -	27
Figure 2.	Distribution of Respondents by Awareness of the Michigan Snowfresh Program - - - - -	28

INTRODUCTION

General Background

Farmers can learn in many different ways. Because of the complex nature of human society, every society has its own needs and problems. Within the society, every individual has his or her own needs, interests, and constraints. Learners may utilize various Sources and Channels of Information in their learning process.

Technological development has made a wide range of media available. Developments in the field of electronic media especially computer technology, have brought dramatic changes in the access to information through the information super highway. The mass media--radio, television, newspapers, and magazines--with their capacities for instant dissemination of information are symbolic of this mercurial era. Davis and Baran (1981) argue that mass media have power only to reinforce, because people are generally selective in their use of the media. They expose themselves only to types of content that they see as consistent with what they already believe. People quickly forget content that is inconsistent with their beliefs. These phenomena are called selective perception and selective retention. Depending upon their needs and interests, individuals have their own preferences on how they learn.

Based on the social, cultural, economic, physical and other demographic characteristics of the learners, communication media that are used may assist or hinder the learning process. Thus while attempting to communicate with individuals or groups, selection of appropriate Channels is a most crucial task. Selection of Channels may vary with the type of audience, the type of message, and the recipients stage in the

adoption process. No matter how important is the message, it will not get through to the intended audience without the use of proper media. Hence, Marshal McLuhan (1964) has advocated caution for those who say "Medium is the Message.". According to his view "medium" should not dominate the essence of "message" or the content. Selection of highly sophisticated "medium" may be counterproductive because the audience will not pay attention to the content which is definitely the goal of communication in the process of teaching and learning. Media can best be used as an "engine" of change if used in a planned way (McQuail, 1983).

Communication is an indispensable part of an extension education program. Communication media are aimed at helping to bridge the knowledge gap between the audience/clientele and various information sources such as universities, research stations, extension offices, farmers and others.

Since the philosophy of extension education is to cause behavioral changes in the clientele, the extension worker cannot expect to cause change until he or she is able to communicate effectively. In order to ensure that research results, advances in technology or even basic information may reach intended beneficiaries in a form which they can readily understand and use, an extension system should employ many different methods of communication--mass methods, group methods, and individual or personal contact methods.

Mass media are extensively used as communication channels in the teaching and learning process. In addition to mass media channels, farmers get information through other sources such as cosmopolite interpersonal channels and localite interpersonal

channels. Cosmopolite interpersonal channels comprise face-to-face communication with extra-systemic sources such as change agents, scientists, and commercial agents. Localite interpersonal channels refer to those face-to-face communication channels with intra-systemic sources such as relative, friends, neighbors, local leaders, and others that belong to the respondent's social system (Lingamneni, 1981). Singh (1981) pointed out that the media effectiveness is in the way the message is acquired. The effectiveness of channels can be optimized by making qualitative changes in content, mode of presentation, quality and relevance of the message. This can be done only when the change agents understand the socio-cultural context of the audience. Singh (1981) further indicated that preconditions for the effective communication include farmers' socio-economic status, level of education, social participation, age, adoption status, the stage at which he/she is in the adoption process, existing level of knowledge about the message, his/her attitude toward self, toward communicator, and toward message, his/her change-proneness, value orientation, aspirations for future attainments, his/her past experience with the communicator's message, his/her length of farming career and many other factors.

Christmas Tree Industries and their Current Issues in Michigan

The Christmas tree industry is one of the major agricultural industries in the economy of Michigan. Michigan, a leading Christmas tree producing state in the United States of America, produces approximately 15 percent of the national supply. Each year more than five million trees are harvested by Michigan growers. Nearly three fourths of the annual harvest is sold outside the Michigan market through retailers and brokers. There is an estimated 1400 Christmas tree farms which cover 130,000 acres of plantations.

The Michigan Christmas Tree Association (MCTA) members represent 80 percent of the state's annual harvest. Operations range from only few acres to five thousand acres. Although almost all counties have Christmas tree farms, the major concentrations are in a western portion of the lower Peninsula and some other locations in the Upper Peninsula (Michigan Department of Agriculture, 1994).

Two current issues in the Christmas tree industry in the State of Michigan are-- high competition among growers, and changes in consumer demands for species preference. Christmas tree growers have been facing several challenges to produce quality plants. Some of the emerging needs of the Christmas tree growers are research on the promotion of a natural tree market, consumer education programs, species evaluation, standardization of fertilization methods, production of healthy plants, and mechanized harvesting (Koelling, Hart, and Leefers, 1992).

Statement of the Problem

Various extension media have been employed by different extension agencies for the development and promotion of Christmas tree industries in the State of Michigan. The way farmers perceive their problems may be different from the way media practitioners and development and funding agencies perceive those same problems. Information and understanding is lacking as to the ways that farmers prefer to learn about new ideas and practices in Christmas tree farming.

Purpose of the Study

The major purpose of this study was to document the preferences that Christmas tree growers in Michigan have for receiving information about farming practices and to analyze the relationships between those preferences and other variables.

Research Questions

The study was organized around a series of specific research questions that were used to operationalize the major purpose of the study and to frame the questions to be used for gathering data through survey instrumentation. To meet the above research purpose the following specific research questions were set by the researcher:

Research Question # 1. To what extent have the Christmas tree growers been using different Sources and Channels of Information to solve their farming problems?

Research Question # 2. What are the perceptions of the Christmas tree growers about the usefulness of different Sources and Channels of Information used for their Christmas trees production needs?

Research Question # 3. Which Source(s) and Channel(s) of information do the Christmas tree growers prefer to use or seek out for specific farming practices/concerns?

Research Question # 4a. Is there a relationship between Christmas tree growers' age, Christmas tree farming experience or farm size and the use of Sources of Information?

Research Question # 4b. Is there a relationship between Christmas tree growers' age, Christmas tree farming experience or farm size and the use of Channels of Information?

Research Question # 5a. Does the use of Sources of Information by Christmas tree growers differ according to age, education, income, farm ownership, and type of farm?

Research Question # 5b. Does the use of Channels of Information by Christmas tree growers differ according to age, education, income, farm ownership, and type of farm?

Research Question # 6. Is there a difference between members and nonmembers of the Michigan Christmas Tree Association in terms of their use of Sources of Information, use of Channels of Information, and change in their size of Christmas tree farm operation during the last ten years?

Research Question # 7. Is there a difference between members and nonmembers of the Michigan Christmas Tree Association in terms of their awareness of the Michigan Snowfresh Program?

Significance of the Study

This study is intended to help to fill the knowledge gap regarding the Sources and Channels of Information used by the growers of Christmas tree in the State of Michigan. The information could be utilized by personnel of the Michigan State University-Extension to develop the strategies and policies in the delivery of technical information for the promotion of Christmas tree industries in the State of Michigan. The findings could be equally helpful to the Michigan Christmas Tree Association to meet its objectives of producing high quality trees by providing technical information to growers. Additionally, commercial industries, especially suppliers of pesticides and equipment, could benefit by adopting appropriate marketing strategies for their products. Finally, the research findings could help researchers and professionals by giving future direction on the study of promotion of Christmas tree industries.

Operational Definitions

Sources of Information The person or institution which provides information based on research or first-hand experience with Christmas tree production and management practices.

Channels of Information The method of delivery of information in the form of written, verbal, audio, and visual and audio-visual. Channels of Information are also interchangeably used as media in the paper.

Christmas Tree Growers To qualify as a Christmas tree grower, an operation had to have grown at least one acre of Christmas trees for sale and should be

registered.

Farming Practices Techniques a grower uses to enhance or maintain profitability of a farm by using a machine, concept, cultural practice, or behavior, such as soil and seed treatments, irrigation, selective weed control, and marketing.

Change in Christmas Tree Farming This refers to the change in the size of Christmas tree farming operation during the last ten years.

Member and Nonmember Members refer to those Christmas tree growers who have registered their Christmas tree farm at the Michigan Christmas Tree Association (MCTA) and hold member.

Nonmembers refer to those Christmas tree growers who do not belong to the MCTA and are independent entrepreneurs.

Michigan Snowfresh Program This is a special project which deals with the production and management of high quality Christmas trees which meet the standards set by the MCTA.

Cooperative Extension Service. Cooperative Extension Service refers to the Michigan State University Extension (MSUE). For the convenience of respondents- easy to understand- Cooperative Extension Service (CES) is used in the instrument.

Soil Conservation Service. Soil Conservation Service has currently changed its name into the Natural Resource Conservation Service (NRCS). For the convenience of respondents, Soil Conservation Service is used in the instrument.

Limitations of the Study

About population: The researcher was dependent on the list of Christmas tree growers from the Michigan Christmas Tree Association and the Michigan Department of Agriculture. There might be some active Christmas trees growers missing in the list.

About Sources and Channels of Information: This study did not attempt to specify the effectiveness of certain Sources and Channels of information. For example, the researcher did not ask like which magazine, or which journal is more useful for receiving Christmas tree farming information? Similarly, this study did not attempt to identify the effectiveness or relevancy of content of message or information that were broadcasted or extended through radio, television, computer, journals and magazines.

REVIEW OF LITERATURE

Introduction

The purpose of this study was to explore the Sources and Channels of Information and their relationship to farm and selected demographic characteristics of the growers of Christmas tree in the State of Michigan. The review of literature gives insights in the field of proposed study which helped to form the theoretical framework of the study. This chapter contains a synthesis of selected research and literature that are relevant to this study. The process was completed by searching the Current Index of Journals in Agriculture and Extension, Communication; and Education Resources Information Center (ERIC); and Tree Compact Discs Data Base. The literature review found that the bulk of the published work has been done on the economical and biological aspects of Christmas tree production and management. No research on Christmas trees was conducted preferences of Christmas tree farmers for receiving information but similar types of research were conducted in the field of Agricultural Extension, Communication, and Sociology. In addition to library research, a number of interviews with researchers and professionals involved in the field of Christmas tree industry was conducted to identify the major issues and extension methods employed in the Christmas tree industries.

Conceptual Framework

Extension may be described an approach or technique of reaching the people. In any extension program, effective dissemination of information is as important as the development of technical knowledge. Extension is education and education is the process of bringing about desirable changes in human behavior. This is done by attracting their attention, arousing their interest, helping them define their problems and leading them to have successful experiences with new ways of doing things. Extension programs are intended to cause people to adopt new ideas and practices to increase the effectiveness in various life roles of persons--parents, workers, and citizens. The outcomes of a program may fail to cause client change due to lack of proper dissemination of technique or methods of information to the clients although the program is socially acceptable, technically sound and economically feasible.

One of the issues facing extension agents is how to best get information to their clientele. Extension is an adult education program. Farmers are adult learners and they probably learn from a variety of resources that exist all around them. Sometimes, unanticipated learning takes place among the learners themselves, driven by learner needs rather than instructional objectives (Levine, 1994). Often, extension agents, as adult educators may make mistakes by assuming that learning can be promoted in mandatory ways. Levine (1987) further asserts that learning can't be promoted in mandatory ways and the teacher is not the only resource available to the learners. An effective communication system plays a vital role for the sustainable extension system. The extension system could be sustainable when its programs are relevant and

extension agents are accountable to the clients. Relevancy is measured in terms of the degree of practicality to serve the farmers' felt needs (Axinn, 1994).

Axinn and Thorat (1972) presented general propositions regarding a successful extension program. The success of extension programs in any particular locality tends to be directly related to the extent of personal contact between the people of that locality and staff of the extension organization and multiple use of communication methods. They suggest that the effectiveness of communication between sender and receiver can be increased by increasing the number of parallel channels. The more communication channels in parallel, the greater the chance that any particular message sent by the communicator will be received by the receiver.

Effectiveness of communication can be increased by multiple use of methods or channels. Research on effects of senses on learning show that there is 1% learning through taste, 1.5 % through touch, 3.5 % through smell, 11% through hearing and 83% through sight. In terms of retention we retain, 10% of what we read, 20% of what we hear, 30% of what we see, 50% of what we both hear and see, 70% of what we discuss, 80% of what we experience and 95% of what we teach someone else (Dahama, 1979).

Extension Approaches

A literature review and interviews with professionals, researchers, and leaders in the field of Christmas tree promotion, production and management revealed that all different Sources and Channels of Information are being employed for the promotion of

the Christmas tree industry in the State of Michigan. The Michigan State University Extension (MSU-E) is an educational outreach arm of Michigan State University. Its mission is to help people improve their lives through an educational process that applies knowledge to critical issues, needs, and opportunities (MSU, Extension Leaflet). All three different approaches--mass approach, group approach and personal approach of extension-- are being employed by the MSU-Extension. Researchers and subject matter specialists in Christmas trees at the M.S.U. Forestry Department are involved in and responsible for writing bulletins, articles in magazines, and conducting both regular and special workshops in Christmas tree farming. A radio "Call in Program" is sponsored by WKAR radio in East Lansing each month. The television outreach communication of university broadcasts are three-to five-minute snapshots of stories on current events and seasonal activities on Christmas tree production and management and other forestry issues. In addition to MSU-E, a few other agencies and professional organizations such as the Michigan Christmas Tree Association, commercial companies (pesticide and equipment) and private nurseries are involved in the extension and communication process. The objectives of the MCTA are to promote the production of Christmas trees in Michigan by providing information to growers on cultural practices necessary for quality tree production. It has expanded its objectives to include providing information to retailers and consumers on the use of natural Christmas trees, and providing marketing information to purchasers of Michigan-grown Christmas trees. The Association publishes the Michigan Christmas Tree Journal (a quarterly journal) Buyers Guide, and Membership Directory. Additionally, the

association conducts two annual meetings one in winter and another in summer every year. The MCTA also conducts educational workshops for producers each year in cooperation with Michigan State University Extension.

Synthesis of Relevant Research to the Proposed Area of Study

A Study of Media Usage and Preference by United States Farmers (1994)

revealed that the best Source of Information for grain markets, farm livestock market, and farm news was radio. Television is the best Source of Information for farm weather. Television and farm magazines are equally important Sources of Information for farm livestock markets. Farm magazines come first for special farm reports but as the second best source for farm news followed by electronic data, ranked third. Again, radio is the most used media source for farm grain markets, farm livestock markets, farm news and special farm reports. Farm magazines are the second most used media source for farm grain markets and for farm news. Television is most used source for farm weather and used as second most used media for farm livestock market and for farm news. Radio is reported as the second most used media source for farm weather.

Al-Howshabi (1993) reported in his study of preferred Channels of issue-related information during knowledge and persuasion stages of innovation adoption that television and newspapers were ranked as the most useful information Channels. Radio, newsmagazine, newsletters, books/library, friends, relatives, neighbors, classes/courses, and extension agents were ranked as moderately useful Channels of Information. Videotapes, seminars, conferences, local leaders, billboards, group

demonstration/field days and sales persons were ranked as the least useful information channels. The study indicated that reading newspapers, watching television, reading newsletters, and listening to radio were the most preferred information channels in both knowledge and persuasion stages of adoption.

Vergot (1991) concludes in his doctoral dissertation entitled "Southwest Michigan Fruit and Vegetable Farmers' Use of Sources and Channels to Gain Information in Regard to New Agricultural Practices" that County Cooperative Extension Service personnel were ranked first followed by product company representatives as second for Source of agricultural information. Vocational agricultural teachers and Farmers Home Administration personnel were ranked lowest for Sources of agricultural information.

Farm magazines ranked first followed by agricultural bulletins from MSU as the second most used Channel of agricultural information. The least used Channels were television advertisements and programs. The relationship between farm size and use of Sources of Information was significant since larger farm size holders hired private consultants. As the farm income increased, farmers more frequently used MSU Specialists, farm magazines, telephones and video tapes as Sources or Channels of Information. The relationship between age of the farmers and Sources of Information was significant. Older farmers used more traditional forms of information than their younger counterparts. Younger farmers used a greater variety of both Sources and Channels than older farmers. Farmers with high school diplomas, two year degrees or four-year degree or more utilized agricultural trade shows as a Channel of Information

significantly more than farmers with less than a high school education. Farmers with fewer years of experience used a greater variety of Sources and Channels than farmers with many years of experience. Daily newspapers and agricultural educators are utilized by farmers with more experience in farming. Male farmers utilized local salesmen, private consultants and agricultural trade shows more significantly than female farmers. Partnership farmers have greater use of Farmers Home Administration personnel, agricultural trade shows and telephone recordings as Sources and Channels.

Reyes (1991) reported that Extension agents were considered as extremely useful Source of Information for pest/disease management whereas agricultural magazines were found very useful Source of Information to the farmers of Ingham county for pest disease information. Newspapers and direct mail were considered as not very useful Source of Information about pest and disease. Agricultural magazines and other farmers were found to be very useful for crop production.

A study conducted by Obahayujie and Hillison (1988) on the assessment of extension methods by part-time and full-time farmers indicated that part-time beef farmers preferred more individual contact methods such as on-farm demonstration and farm and home visits but full-time farmers preferred mass contact methods, such as newsletters, bulletins, radio and leaflets/pamphlets. The lowest ranked methods by both groups were visits to universities, news stories, posters, clinics, computer messages and cartoons. The authors recommended that extension methods used must coincide with the maturity, education level, background, and objective of the audience being served in order to increase both efficiency and effectiveness.

Mahjoory (1982) in his study of use of soil survey information by farmers in five Michigan Counties revealed significant relationship between level of education and use of soil survey information. His findings showed that farmers are most likely to seek information on soil problems from Soil Conservation Service, Cooperative Extension Service, other farmers, and commercial salespersons.

Smith and Kahler (1982) in their investigation found that farm magazines were the first choice of the respondents as a Source of technical information with commercial companies being next and radio for agriculture being third. The respondents participated more actively (90 percent) in the commercial company sponsored educational programs than in programs conducted by an Extension agency. The result showed that as the educational background of the participants increased, greater participation in extension meetings and clinics resulted. Well-established farmers placed more value on farm magazines as a Source of Information than those of less-established in farming. Respondents gave the highest rating to the area of short courses followed by closed circuit television programs as a choice of teaching approaches. Extension agents were perceived by the participants as of "some value" as Source of technical information.

Participants with individual farming operations, well-established farming, big farm size, greater profit margins from their farming enterprises, more participation in leadership put more value on instruction.

Kolmer (1972) advocates that effective extension delivery system should be "close by and convenient". It means involving county extension professionals who are

on-site salesmen for local educational programs. Their bread-and-butter-tool is a single meeting, usually held at night, oriented to a particular topic.

Tichenor, Donohue and Olien (1970) argued that persons with more formal education would be expected to have the higher reading and comprehension abilities necessary to acquire public affairs or science knowledge. They questioned their respondents on the use of printed mass media. This team of researchers expresses the view that given the nature of the mass media system that delivers information, the most science and public affairs' news carried in print media have been more heavily used by higher status persons.

Crawford (1969) and Stadlman (1973) pointed out that magazines, television, newspapers, and radio were used by farmers to solve their problems but they were inadequate in meeting the education needs of the young farmers. They suggest formal instruction that presents latest technical information related to specific problems farmers were attempting to solve.

METHODOLOGY

Study Method

A survey-questionnaire method was employed to carry out this study. A pre-structured, pretested and coded questionnaire was mailed to 265 Christmas tree growers in Michigan. The first mailing was done on August 15, 1995. The survey questionnaire form was sent along with a self addressed and prestamped return envelope. Three weeks later, a second mailing was done including survey questionnaire form and prestamped envelope. Again, three weeks after the second mailing, a reminder letter was sent to those respondents who didn't return completed survey questionnaires. Out of 265 survey questionnaires mailed, 161 were returned (60.75%), and 153 (57.74%) were usable, eight unusable, and six nondeliverable.

Study Population, Sampling Method and Sample Size

The population for the study consisted of total 790 Christmas tree growers in the state of Michigan. A comprehensive list of all Christmas tree farmers was obtained from the Michigan Christmas Tree Association, Michigan Department of Agriculture, and Michigan State University Extension. Systematic sampling method was used in this study. The total sample size of 265 Christmas tree farmer was selected on the basis of 95 percent confidence interval and 5 percent margin of sampling error (Levine and Suvedi, 1994). To obtain the total of 265 sample size, every fourth element of the list was chosen systematically for inclusion in sample. To ensure against any possible human bias in using this method, the first sample number was drawn from a random

table with a random start. Then every fourth element was picked up as a sample.

Instrumentation of the Study

The survey questionnaire was developed considering each research question to be answered. The instrument was divided into two parts. The first part consisted of scales of potential Sources and Channels of Information used by the Christmas tree growers. Use of each source (organizations or agencies) was measured by the approximate number of times that respondents used it in a year. Use of media or Channels was rated at four-point scales as follows: 3= Always, 2= Often, 1= Rarely; and 0= Never use. To determine the perception of usefulness regarding the Sources and Channels, again a four-point scale was used as 3= Very useful, 2= Somewhat useful, 1= Not very useful, and 0= Of no use at all. Preferred Sources and Channels of Information for specific farming practices were measured by giving options to choose multiple answers from the identified agencies/organizations and media. The second part consisted of general background information regarding personal and farm characteristics. Date of birth, years of Christmas tree farming, and farm size were asked in ratio scale, gross annual income level was asked in interval scale ranging from less than \$ 10,000.00 to \$ 80,000.00 and above; and education level was measured in ordinal scale ranging from less than high school education to College or University graduates. Questions relating to change in size of Christmas tree farm operation, farm ownership, Christmas tree farm type, awareness of the Michigan Snowfresh program and membership of the Michigan Christmas Tree Association were asked in nominal

scale by giving multiple choice options (See Appendix B for copy of the instrument).

Handling Nonresponse Error

Nonresponse error was handled by comparing early respondents to late respondents on selected demographic characteristics. Statistical comparison between these two groups was done for demographic characteristics such as education level, age, years of Christmas tree farming, and size of Christmas tree farm. The analysis revealed no significant differences between early respondents and late respondents so the findings from the sample could be generalized to the population (Miller and Smith, 1983).

Data Analysis and Interpretation

As this was a descriptive research study, descriptive statistics--frequency, percent, means, standard deviations--were used to analyze the data. Also, inferential statistics i.e., t-test, and Chi-Square tests, were employed. The data were processed and analyzed by using the Statistical Package for Social Sciences (SPSS for Windows).

To be more specific, frequency, means and standard deviation by rank order was used to analyze the data regarding the use of Sources and Channels of Information, perception of usefulness of Sources and Channels of Information and preferred Sources and Channels of Information for the research questions one, two and three. Pearson correlation coefficient was used to determine the relationship between demographic characteristics such as age, experience in Christmas tree farming, and farm size, and

the use of Sources and Channels of Information for the research question 4a and 4b.

The following commonly accepted set of descriptors proposed by Davis (1971) was used to interpret the strength of associations.

<u>Coefficient</u>	<u>Description</u>
.70 or higher	Very strong association
.50 to .69	Substantial association
.30 to .49	Moderate association
.10 to .29	Low association
.01 to .30	Negligible association

However, the data which show coefficient 0.30 (moderate association) and above were considered as important to analyze the data. One-Way analysis of variance (ANOVA) was run to determine the significant difference between demographic characteristics such as education, income, farm ownership and farm type and use of Sources and Channels of Information for research question 5a and 5b. Independent t-test was conducted to determine the difference between age groups and use of Sources of Information. Similarly, t-test was done to determine difference between member and nonmember farmers for the use of Sources and Channels of Information. Chi-square test was done to determine the difference between member and nonmember farmers in terms of awareness and perception of change in Christmas tree farming. The alpha was set a-priori at .05.

To allow for interpretation of the data, it was important to establish a criterion measure. This criterion measure was used to ascertain the importance of the data when

it was analyzed and displayed. Such a criterion measure, though arbitrary, must have some form of logical derivation. For this study it was decided that the concept of a normal distribution would be the basis for deciding importance. Therefore, any data that fall within the highest 16% of the possible range of scores, or within the lowest 16% of the possible range of scores are defined as “important”. This criterion removes the middle 68% of the possible range of scores as not important.

FINDINGS

Organization of the Findings

This chapter presents the results obtained from the statistical analysis of the data. The study findings are organized based on the research questions set for the study purpose which include general description of the respondents, uses of Sources and Channels of Information, perception about their usefulness, and preferences in getting them. Finally, the relationships and differences between demographic characteristics and usage pattern of different Sources and Channels of Information are presented.

General Description of the Respondents

Age. The mean age of respondents was 54.47 years with a standard deviation of 12.94. The range of age ranged between 17 and 84 years. For the purpose of analysis, the respondents were further categorized into four groups based on standard deviation. Table 1 shows that highest number of respondents, 54 (36.00%), were between 42 and 55 years old.

Table 1. Distribution of Respondents by Age

Age	N (%)
17 to 41 years old	27 (18.00)
42 to 54 years old	54 (36.00)
55 to 67 years old	43 (28.67)
68 years and above	26 (17.33)
Total	150 (100)

Education. The respondents were categorized into five groups ranging from less than high school education to college or university graduates. Table 2 shows that the highest number of respondents, 58 (39.21%), was college or university graduates and the lowest number of respondents, 9 (5.88%), was less than high school education.

Table 2. Distribution of Respondents by Education Level

The Level of Education	N (%)
Less than high school	9 (5.88)
High school graduate	32 (20.92)
Some college education	41 (26.80)
Community/Junior college	11 (7.19)
College/University graduate	58 (39.21)
Total	153(100)

Income. The respondents were asked to choose one of the six categories of gross annual family income level that best describes them. The frequency analysis showed that the mean annual income level of the respondents was between \$ 40,000 to 60,000. The highest number of respondents 39 (30.23 %) also belonged to the same income level. Thirty-four (26.36%) respondents had a gross annual income of \$ 80,000.00 or more. Respondents with less than \$ 10,000.00 were the smallest group with 3 (2.33%) of the total respondents. Table 3 presents the distribution of respondents by their gross annual income.

Table 3. Distribution of Respondents by Gross Annual Income

Level of Income	N (%)
Less than \$ 10,000.00	3 (2.33)
\$ 10,000 to \$ 20,000	11 (8.53)
\$ 20,000 to \$ 40,000	28 (21.70)
\$ 40,000 to \$ 60,000	39 (30.23)
\$ 60,000 to \$ 80,000	14 (10.85)
\$ 80,000 and above	34 (26.36)
Total	129 (100)

Experience in Christmas Tree Farming. The experience in Christmas tree farming ranged from 2 years to 60 years. The mean experience was 21.57 years with a standard deviation of 12.52. The respondents were further grouped into four groups based on standard deviation. Table 4 shows that the highest number of respondents, 72 (48%), had ten to twenty-one years of experience in Christmas tree farming.

Table 4. Distribution of Respondents by Number of Years of Experience in Christmas Tree Farming

Years of Experience	N (%)
lowest through 9 years	21 (14.00)
10 through 21	72 (48.00)
22 through 35	35 (23.33)
36 years and above	22 (14.67)
Total	150 (100)

Membership. Out of 153 respondents, ninety-seven (63.40 %) of them were members of the Michigan Christmas Tree Association and fifty-six (36.60 %) were nonmembers. Figure 1 shows the distribution of respondents by membership status.

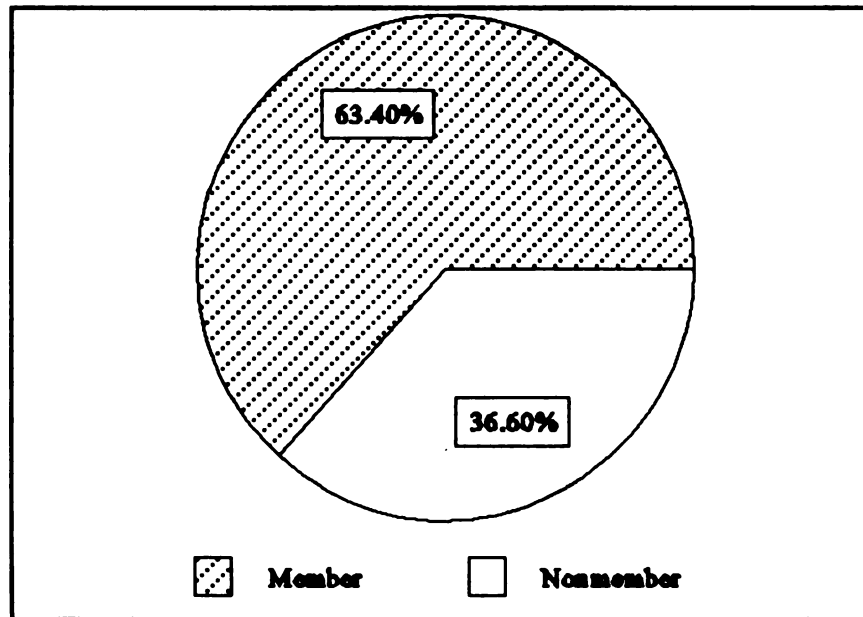


Figure 1. Distribution of Respondents by Membership Status of the Michigan Christmas Tree Association

Awareness of the Michigan Snowfresh Program. This is a special project sponsored by the Michigan Christmas Tree Association in order to produce high quality Christmas trees in Michigan. Members should register to participate in this program. Christmas tree growers are provided training about management and production of Christmas trees. The MCTA has set its own standard for the quality of Christmas trees in terms of form (shape) and health status of plants. Figure 2 shows that 126 (82.89 %) respondents were aware of the Michigan Snowfresh program.

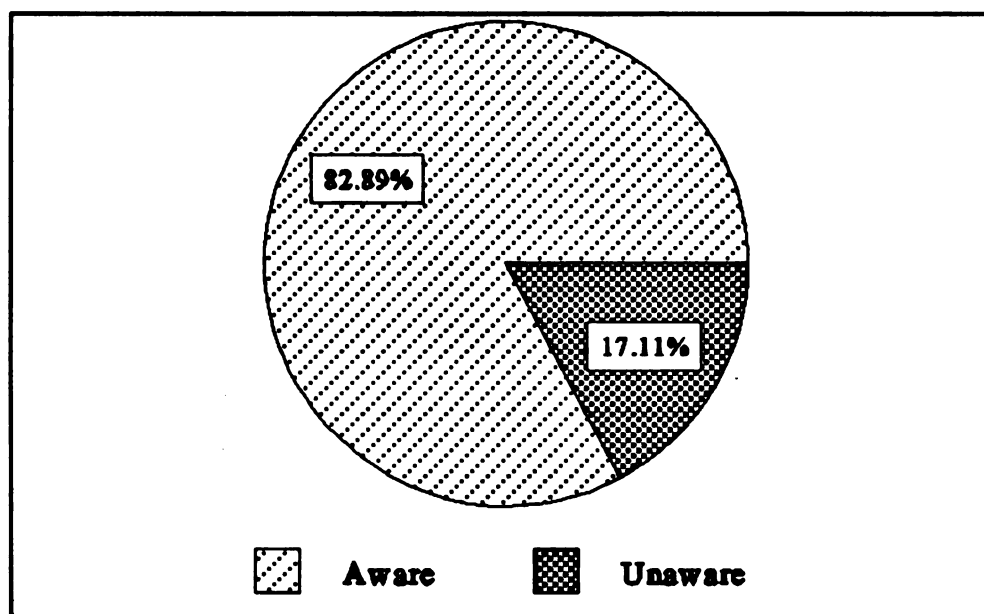


Figure 2. Distribution of Respondents by Awareness of the Michigan Snowfresh Program

Farm Type. Christmas tree growers have specialized their farms in terms of selling their product. Respondents were asked to check the appropriate box that best describes their Christmas tree farm based on their product sold. Table 5 shows that 56 (37.09 %) Christmas tree growers were wholesalers only and eight (5.3%) Christmas tree growers were retailers only. Thirty-four (22.52%) respondents had choose-and-cut only farms.

Table 5. Distribution of Respondents by Type of Christmas Tree Farm

Type of Farm	N (%)
Wholesale only	56 (37.09)
Choose-and-Cut only	34 (22.52)
Wholesale and Retail	21 (13.91)
Wholesale and Choose-and-Cut	15 (9.93)
Wholesale, Choose-and-Cut and Retail	15 (9.93)
Retail only	8 (5.30)
Others	2 (1.32)
Total	151 (100)

Change in Size of Christmas Tree Farm Operation. In order to understand the general trend in the size of Christmas tree operation, respondents were asked to indicate the change in their operation during the last ten years. Table 6 shows that 63 (41.18 %) indicated a decrease in their Christmas tree farm size during the last ten years. Sixty-one (39.87 %) farmers indicated an increase in their operation. Twenty-nine (18.95 %) farmers responded “no change” in their Christmas tree operation.

Table 6. Distribution of Respondents by Change in Size of Christmas Tree Farm Operation

Christmas Tree Farming	N (%)
Increased	61 (39.87)
Decreased	63 (41.18)
No change	29 (18.95)
Total	153 (100)

Farm Ownership. Table 7 shows that a majority of the Christmas tree farms 129 (84.31%) were individually owned. Thirteen (8.50 %) respondents own their Christmas tree farm as partnership and eight (5.23 %) respondents had both own and partnership.

Table 7. Distribution of Respondents by Type of Farm Ownership

Ownership	N (%)
Individual	129 (84.31)
Partnership	13 (8.50)
Individual and Partnership	8 (5.23)
Others	3 (1.96)
Total	153 (100)

Use of Sources of Information

Respondents were asked to indicate an approximate number of times each year they turn to different Sources to seek Christmas tree farming information. Results are presented based on frequency, means, and standard deviation for each Source of Information. Table 8 shows that most Christmas tree growers, 112 (73.20%), use Michigan State University Extension followed by pesticide companies, 110 (71.90%), and the Michigan Christmas Tree Association, 104 (67.97%).

Friends/neighbors/relatives and Christmas tree equipment industries were equally used by Christmas tree growers to receive information. The Natural Resource Conservation Service was consulted by lowest number of respondents, 57 (37.25%). Christmas tree growers were using other Sources of Information than the listed Sources for their

Christmas tree farming needs. Other organizations consulted include the Pest Alert, and the Wisconsin Tree Association.

Table 8. Use of Sources of Information

Sources of Information	N (%)
Michigan State University Extension	112 (73.20)
Pesticide companies	110 (71.90)
Michigan Christmas Tree Association	104 (67.97)
Friends/Neighbors/Relatives	95 (62.09)
Christmas tree equipment industries	95 (62.09)
Natural Resource Conservation Service	57 (37.25)

The use of each Source of Information is further broken down into different levels of contacts per year. Table 9 shows that Christmas tree growers most frequently consulted friends/neighbors/relatives with an average contact of 5.35 times in a year. The Michigan Christmas Tree Association was the second most frequently consulted source, 3.72 times in a year, followed by Christmas tree equipment industries, 3.56 times in a year. Eighty-six (76.79%) of the respondents consulted the Michigan State University Extension 1 to 3 times. Although, the highest number of respondents, 112 (73.20%), turned to the Michigan State University Extension for Christmas tree farming information, the average contacts per year was higher for friends/neighbors/relatives. The Michigan State University Extension was contacted by more respondents with lower number of visits per year whereas friends, neighbors and

relatives were consulted by less number of respondents with higher number of contacts per year.

Table 9. Use of Sources of Information by Number of Contacts per Year

Sources of Information	N	Total # of Counts	Mean	S D	Frequency of Contact /Year			
					Never	1 to 3 times	4 to 8 times	9 and above
Friends/Neighbors Relatives	95	508	5.35	4.62	17	43 (45.26)	31 (32.63)	21 (22.11)
Michigan Christmas Tree Association	104	387	3.72	3.19	21	57 (54.80)	40 (38.47)	7 (6.73)
Pesticide companies	110	374	3.40	3.32	18	73 (66.36)	28 (25.46)	9 (8.18)
Christmas tree equipment industries	95	338	3.56	4.71	27	69 (72.63)	17 (17.90)	9 (9.47)
Cooperative Extension Service	112	320	2.86	2.85	20	86 (76.79)	21 (18.75)	5 (4.46)
Soil Conservation Service	57	108	1.90	1.54	47	51 (89.47)	5 (8.78)	1 (1.75)

Use of Channels of Information

Table 10 shows the use of Channels of Information. To interpret the data for the use of Channels of Information, the aggregate scores of “always use” and “often use”, and “rarely” and “never” were considered. According to the criterion measure when the scores were equal to or more than 84% i.e. within the highest 16% of the possible range of scores, they were considered used Channels of Information. When the scores were equal to or less than 16% i.e. within the lowest 16% of the

possible range of scores, they were considered as unused Channels of Information. Radio, television, and computer aggregate scores fell within the lowest 16% of the possible range of scores so they were considered as unused Channels of Information by the growers of Christmas tree to receive the Christmas tree farming information. The combined score of rarely used and never used was 96.64% for use of radio, 98.33% for use television, and 90.43% for use of computer. Although the other Channels of Information were reported to have been frequently used, none were used to the extent required by the test of 84% or more from the aggregate scores of "always" and "often".

Table 10. Use of Channels of Information

Channels of Information	N	Frequency of Use (%)			
		Always	Often	Rarely	Never
Journals/Magazines Bulletins/Newspapers	149	33 (22.15)	84 (56.38)	26 (17.45)	6 4.02
Telephone	127	30 (23.62)	63 (49.60)	17 (13.39)	17 13.39
Meetings/Seminars Workshops	136	21 (15.44)	60 (44.12)	39 (28.68)	16 11.76
Exhibitions Demonstrations	126	15 (11.90)	49 (38.90)	42 (33.33)	20 15.87
Radio	119	0 (0.00)	4 (3.36)	37 (31.09)	78 65.55
Television	120	2 (1.67)	0 (0.00)	37 (30.83)	81 67.50
Computer	115	0 (0.00)	11 (9.57)	14 (12.17)	90 78.26

Perceptions about Usefulness of Sources of Information

Respondents were asked to indicate their familiarity with Sources of Information by providing an option “not familiar with” along with their usefulness rated at four-point scale (0= Of no use, 3= Very useful). Table 11 presents the familiarity of respondents with Sources of Information. As Table 11 shows, more than 90 % of the respondents were familiar with the Sources of Information. The number of respondents familiar with the MCTA was the highest, 136 (97.84%), whereas the least number of respondents, 122 (92.41%), was familiar with Natural Resource Conservation Service.

Table 11. Respondents' Familiarity with Sources of Information

Sources of Information	N	Frequency (%)	
		Familiar with	Not familiar with
Michigan Christmas Tree Association	139	136 (97.84)	3 (2.16)
Pesticide companies	139	135 (97.12)	4 (2.88)
Michigan State University Extension	142	136 (95.78)	6 (4.22)
Christmas tree equipment industries	138	131 (94.93)	7 (5.07)
Friends/Neighbors/Relatives	132	128 (97.40)	4 (2.60)
Natural Resource Conservation Service	132	122 (92.41)	10 (7.59)

Table 12 presents the perceived usefulness of Sources of Information. Only those respondents who indicated that they were familiar with a particular Source of Information were included in the data for Table 12. Based on the criteria of importance, respondents perceived the Michigan Christmas Tree Association, pesticide companies, and the Michigan State University Extension as useful Sources of Information for their Christmas tree farming. The combined scores of "very useful" and "somewhat useful" were 85.30% for the MCTA, 88.89% for pesticide companies, and 84.56% for the Michigan State University Extension respectively. In other words, fewer than 16% of the respondents regarded the usefulness of each of those three sources as not useful.

Table 12. Perceived Usefulness of Sources of Information

Sources of Information	N	Rated Frequency of Usefulness (%)			
		Very useful	Somewhat useful	Not very useful	Of no use
Michigan Christmas Tree Association	136	72 (52.95)	44 (32.35)	10 (7.35)	10 (7.35)
Pesticide companies	135	55 (40.74)	65 (48.15)	11 (8.15)	4 (2.96)
Cooperative Extension Service	136	58 (42.65)	57 (41.91)	16 (11.76)	5 (3.68)
Christmas tree equipment industries	131	38 (29.00)	65 (49.62)	18 (13.74)	10 (7.64)
Friends/Neighbors/Relatives	128	43 (33.59)	56 (43.75)	14 (10.94)	15 (11.72)
Soil Conservation Service	122	23 (18.85)	48 (39.35)	28 (22.95)	23 (18.85)

Perceptions about Usefulness of Channels of Information

Table 13 shows that all of the respondents, 144 (100%), were familiar with journals, magazines, bulletins and newspapers. Exhibitions and demonstrations, were the second most familiar Channels of Information followed by meetings/seminars/workshops, telephone, radio, and television respectively. Responses fell within the highest 16% (84% or more scores) of the possible range of scores for familiar with all Channels of Information except computer (78.52%).

Table 13. Respondents' Familiarity with Channels of Information

Channels of Information	N	Familiarity (%)	
		Familiar with	Not familiar with
Journals/Magazines Bulletins/Newspapers	144	144 (100)	0 (0.00)
Exhibitions Demonstrations	128	126 (98.44)	2 (1.56)
Meetings/Seminars Workshops	137	134 (97.81)	3 (2.19)
Telephone	131	126 (96.18)	5 (3.82)
Radio	127	122 (96.06)	5 (3.94)
Television	127	122 (96.06)	5 (3.94)
Computer (E-mail)	121	95 (78.52)	26 (21.48)

The perceived usefulness of Channels of Information is shown in Table 14.

One hundred thirty (90.23%) of the total respondents perceived journals, magazines, bulletins and newspapers as useful Channels of Information. Radio and television were perceived as not useful Channels of Information by 107 (87.7%) and 109 (89.34%) of the total respondents respectively. In other words, the respondents who perceived radio, and television as useful Channels of Information for their Christmas tree farming practices fell within the lowest 16% of the possible scores

Table 14. Perceived Usefulness of Channels of Information

Channels of Information	N	Frequency of Usefulness (%)			
		Very useful	Somewhat useful	Not very useful	Of no use
Journals/Magazines Bulletins/Newspapers	144	74 (51.39)	56 (38.90)	8 (5.55)	6 (4.16)
Meetings/Seminars Workshops	134	68 (50.75)	40 (29.85)	14 (10.45)	12 (8.95)
Exhibitions Demonstrations	126	48 (38.10)	51 (40.48)	15 (11.90)	12 (9.52)
Telephone	126	60 (47.62)	40 (31.75)	9 (7.14)	17 (13.49)
Radio	122	3 (2.46)	12 (9.84)	41 (33.60)	66 (54.10)
Computer (E-mail)	95	2 (2.10)	15 (15.79)	18 (18.95)	60 (63.16)
Television	122	4 (3.28)	9 (7.38)	37 (30.33)	72 (59.01)

Preferred Sources of Information

Respondents were asked to choose among multiple responses as to their preferences for receiving information for different aspects of Christmas tree farming. Table 15 shows the preferred Sources of Information for different aspects of Christmas tree farming. For marketing information, pesticide companies, Cooperative Extensive Service, Christmas tree equipment industries, and the Natural Resource Conservation Service were not preferred by the respondents. Christmas tree equipment industries and the Natural Resource Conservation Service were not preferred for weed management and insect and disease control information. Pesticide companies and the Natural Resource Conservation Service were not preferred for shearing information. Christmas tree equipment industries were not preferred for fertilization information. Christmas tree equipment industries and the Natural Resource Conservation Service were not preferred for four out of five different aspects of Christmas tree farming.

Table 15. Preferred Sources of Information for Different Aspects of Christmas Tree Farming

Sources of Information	Weed Mgmt. N (%)	Fertilization N (%)	Shearing N (%)	Insect and Disease Control N (%)	Marketing N (%)
Michigan Christmas Tree Association	78 (50.98)	69 (45.09)	83 (54.25)	83 (54.25)	91 (59.48)
Friends/Neighbors Relatives	53 (34.64)	50 (32.68)	59 (38.56)	51 (33.33)	60 (39.21)
Pesticide Companies	102 (66.67)	46 (30.06)	2 (1.30)	108 (70.59)	4 (2.61)
Michigan State University Extension	73 (47.71)	63 (41.18)	32 (20.92)	91 (59.48)	19 (12.42)
Christmas tree equipment industries	16 (10.46)	14 (9.15)	34 (22.22)	15 (9.80)	13 (8.50)
Soil Conservation Service	18 (11.76)	26 (16.99)	2 (1.30)	10 (6.54)	1 (0.65)

Preferred Channels of Information

Table 16 shows that television, computer, and radio were not preferred to receive information for any aspect of the Christmas tree farming. In other words, less than 10% of the total respondents preferred these Channels of Information. None of the respondents preferred radio to receive information for fertilization, shearing, and insect and disease control aspects of the Christmas tree farming. Telephone was not the preference of respondents for fertilization and shearing information of the Christmas tree farming.

**Table 16. Preferred Channels of Information for
Different Aspects of Christmas Tree Farming**

Channels of Information	Weed Mgmt. N (%)	Fertilization N (%)	Shearing N (%)	Insect and Disease Control N (%)	Marketing N (%)
Journals/Magazines Bulletins/Newspapers	115 (75.16)	108 (70.59)	88 (57.51)	117 (76.47)	103 (67.32)
Meetings/Seminars Workshops	97 (63.40)	94 (61.44)	85 (55.56)	99 (64.70)	69 (45.10)
Exhibitions Demonstrations	79 (51.63)	65 (42.48)	77 (50.32)	64 (41.83)	25 (16.33)
Telephone	29 (18.95)	23 (15.03)	15 (9.80)	28 (18.30)	44 (28.75)
Television	6 (3.92)	3 (1.96)	5 (3.27)	5 (3.27)	15 (9.80)
Computer (E-mail)	4 (2.61)	3 (1.96)	2 (1.30)	4 (2.61)	10 (6.53)
Radio	2 (1.30)	0 (0.00)	0 (0.00)	0 (0.00)	8 (5.22)

Relationship between Demographic characteristics and Frequency of Use of Sources of Information

Pearson correlation coefficients were calculated to see the relationship between use of Sources of Information and age, farm size, and number of years of experience in Christmas tree farming. As mentioned in the data analysis and interpretation section of the methodology chapter, only those coefficients which had moderate or higher relationship were considered for discussion. Table 17 shows that the relationships between use of Sources of Information and age of the respondents negligible to low. The relationship between use of Michigan State University Extension and farm size was moderate ($r=0.37$) and significant. The relationship between use of Christmas tree equipment industries and farm size was moderate ($r=0.46$) and significant. The relationship between use of pesticide companies and farm size was moderate ($r=0.34$) and significant. The relationship between use of friends/neighbors/relatives was substantial ($r=0.58$) and significant. In other words, larger the Christmas tree farm size, greater the use of the MSU-E, Christmas tree equipment industries, pesticide companies, and friend/neighbors/relatives to receive the Christmas tree farming information. The relationship between use of Sources of Information and experience in Christmas tree farming was negligible to low.

Table 17. Relationship between Use of Sources of Information and Age, Farm Size and Number of Years of Experience in Christmas Tree Farming

Sources of Information	Age	Farm Size	No. Of Years in Christmas Tree Farming
Michigan State University Extension	$r = -0.14$ $N=129$ $p=0.13$	$r = 0.37$ $N=128$ $p=0.00^*$	$r = .07$ $N=130$ $p=0.44$
Natural Resource Conservation Service	$r = -0.12$ $N=102$ $p=0.22$	$r = 0.08$ $N=100$ $p=0.41$	$r = -0.05$ $N=102$ $p=0.63$
Michigan Christmas Tree Association	$r = 0.04$ $N=122$ $p=0.63$	$r = 0.07$ $N=120$ $p=0.48$	$r = 0.04$ $N=123$ $p=0.68$
Christmas tree equipment industries	$r = -0.06$ $N=120$ $p=0.55$	$r = 0.46$ $N=117$ $p=0.00^*$	$r = -0.01$ $N=119$ $p=0.89$
Pesticide companies	$r = -0.07$ $N=126$ $p=0.42$	$r = 0.34$ $N=123$ $p=0.00^*$	$r = 0.09$ $N=126$ $p=0.30$
Friends/Neighbors/Relatives	$r = -0.19$ $N=111$ $p=0.05^*$	$r = 0.58$ $N=107$ $p=0.00^*$	$r = -0.05$ $N=110$ $p=0.58$

* Significant at 0.05 α level.

Relationship between Demographic characteristics and Frequency of Use of Channels of Information

Table 18 shows that the relationships between use of Channels of Information and demographic characteristics such as age of the respondents, farm size, and number of years in Christmas tree farming were negligible to low. In other words,

age of the respondents, farm size and experience of the respondents in the Christmas tree farming were not strongly associated with the use of Channels of Information.

Table 18. Relationship between Use of Channels of Information and Age, Farm Size, and Number of Years of Experience in Christmas Tree Farming

Channels of Information	Age	Farm Size	No. Of Years in Christmas Tree Farming
Television	$r = .19$ $N = 117$ $p = .04^*$	$r = .16$ $N = 119$ $p = .09$	$r = .13$ $N = 116$ $p = .16$
Radio	$r = .12$ $N = 116$ $p = .19$	$r = .01$ $N = 115$ $p = .91$	$r = .04$ $N = 118$ $p = .65$
Telephone	$r = -.14$ $N = 124$ $p = .12$	$r = .10$ $N = 123$ $p = .29$	$r = -.03$ $N = 126$ $p = .77$
Computer (E-mail)	$r = -.17$ $N = 112$ $p = .07$	$r = .28$ $N = 111$ $p = .00^*$	$r = .11$ $N = 114$ $p = .25$
Journals/Magazines/ Bulletins/Newspapers	$r = -.03$ $N = 146$ $p = .71$	$r = .07$ $N = 143$ $p = .39$	$r = .05$ $N = 147$ $p = .51$
Meetings/Seminars Workshops	$r = .02$ $N = 133$ $p = .80$	$r = .14$ $N = 132$ $p = .10$	$r = .08$ $N = 134$ $p = .33$
Exhibitions/ Demonstrations	$r = .25$ $N = 112$ $p = .01^*$	$r = .12$ $N = 122$ $p = .18$	$r = .06$ $N = 125$ $p = .18$

* Significant at .05 α level.

Variation in the Use of Sources of Information According to Demographic Characteristics (age, education, income, farm ownership, type of farm) of the Respondents

One-way analysis of variance was conducted to determine whether or not there were significant differences among age groups, education, income levels, farm ownership, and type of farm of respondents with the use of Sources of Information. The analysis revealed no significant difference within age groups, education and income levels, and farm ownership of the respondents in terms of using Sources of Information. But there was significant difference between use of Sources of Information and type of farm. The post hoc (Tukey's B test) comparison revealed significant difference in means between farm types--Wholesale only with a mean 3.96 (SD 4.26) and Choose-and-Cut only with a mean 1.54 (SD 1.84)-- in terms of using information through pesticide companies.

Table 19 shows the significant difference between type of farm and use of pesticide companies. An ANOVA results which did not appear significant are presented in appendix.

Table 19. One-Way Analysis of Variance for Type of Farm and Use of Pesticide Companies

Sources	DF	Sum of Squares	Mean Squares	F Ratio	F Probability
Between Groups	5	136.30	27.26	2.63	.03*
Within Groups	119	1234.55	10.37		
Total	124	1370.55			

* Significant at .05 α level.

Table 20 shows the total count, mean and standard deviation for the use of pesticide companies by each of the farm type. As revealed by the ANOVA test, there was significant difference in the mean between the Wholesale only farm and Choose-and-Cut only farms for using pesticide companies to receive information about the Christmas tree farming.

Table 20. Use of Pesticide Companies by Type of Farm

Type of Farm	N	Mean	S D
Wholesale only	53	3.96	4.26
Choose-and-Cut only	26	1.54	1.84
Wholesale and Retail	5	2.20	2.39
Wholesale and Choose-and-Cut	11	1.91	1.38
Wholesale, Choose-and-Cut and Retail	17	3.29	2.93
Retail only	13	1.92	1.55
Total	125		

Table 21 showed that there was variation between the groups for consulting friends, neighbors, and relatives to receive information regarding the Christmas tree farming. A significant difference was found between type of farm and use of friends, neighbors, and relatives. The post hoc (Tukey's B test) comparison revealed significant difference between Wholesale only with mean 5.88 (SD 5.89) and Choose-and-Cut only with mean 2.29 (SD 1.59) in terms of using information through friends/neighbors/relatives.

Table 21. One-Way Analysis of Variance for Type of Farm and Use of Friends/Neighbors/Relatives

Source	DF	Sum of Squares	Mean Squares	F Ratio	F Probability
Between Groups	5	260.54	52.11	2.53	.03*
Within Groups	105	2159.03	20.56		
Total	110	2419.57			

* Significant at .05 α level.

Table 22 shows the total count, mean, and standard deviation of consulting friends, neighbors and relatives for every farm type. As revealed by the ANOVA analysis, the average consulting for friends, neighbors, and relatives differ significantly between Wholesale only farms and Choose-and-Cut only farms to receive information for their Christmas tree farming. In other words, Wholesale only farms used consulted friends/neighbors/relatives significantly more than Choose-and-Cut only farms.

Table 22. Use of Friends/Neighbors/Relatives by Type of Farm

Type of Farm	N	Mean	S D
Wholesale only	48	5.88	5.89
Choose-and-Cut only	21	2.29	1.59
Wholesale and Retail	6	2.67	1.97
Wholesale and Choose-and-Cut	8	3.25	3.33
Wholesale, Choose-and-Cut and Retail	17	5.59	3.78
Retail only	11	3.36	3.88
Total	111		

Variation in the Use of Channels of Information According to Demographic Characteristics (age, education, income, farm ownership, and types of farm) of the Respondents

One-way analysis of variance was conducted to determine whether or not there was a significant difference between age group, education and income levels, farm ownership, and type of farm of respondents with the use of Channels of Information. The results of the analysis revealed no significant difference between the age groups, education, farm ownership and type of farm in terms of use of Channels of Information. But there were significant differences between use of Channels of Information and gross annual income of respondents. The post hoc (Tukey's B test) comparison revealed significant difference in means between the respondents having gross annual income \$ 80,000.00 with a mean 2.03 (SD .84) and the respondents having gross annual income \$ 10,000 to \$ 20,000.00 with a mean .86 (SD .69) in terms

of using meetings/seminars/workshops to receive information. Table 23 presents the results of ANOVA for gross annual income and use of meetings, seminars and workshops.

Table 23. One-Way Analysis of Variance for Gross Annual Income and Use of Meetings/Seminars/Workshops

Sources	DF	Sum of Squares	Mean Squares	F Ratio	F Probability
Between Groups	5	10.54	2.11	2.64	.03*
Within Groups	108	86.09	.80		
Total	113	96.63			

* Significant at .05 α level.

Table 24 presents the mean and standard deviation for each of the income group level.

Table 24. Use of Meetings/Seminars/Workshops by Gross Annual Income of Respondents

Gross Annual Income	N	Mean	S D
\$ Less than \$ 10,000.00	2	2	0
\$ 10,000.00-\$ 20,000.00	7	.86	.69
\$ 20,000.00-\$ 40,000.00	25	1.56	.96
\$ 40,000.00-\$ 60,000.00	37	1.54	.99
\$ 60,000.00-\$ 80,000.00	12	1.92	.67
\$ 80,000.00 and above	31	2.03	.84
Total	114		

The post hoc (Tukey's B test) comparison revealed significant difference in means between the respondents having gross annual income \$ 80,000.00 with a mean 1.96

(SD .74) and the respondents having gross annual income \$ 40,000 to \$ 60,000.00 with a mean 1.31 (SD .93) in terms of using exhibitions and demonstrations to receive information. Table 25 presents the results of ANOVA for gross annual income and use of exhibitions and demonstrations.

Table 25. One-Way Analysis of Variance for Gross Annual Income and Use of Exhibitions/Demonstrations

Sources	DF	Sum of Squares	Mean Squares	F Ratio	F Probability
Between Groups	5	10.42	2.08	2.78	.02*
Within Groups	102	76.49	.75		
Total	107	86.92			

* Significant at .05 α level.

Table 26 presents the total count, mean, and standard deviation for different income group respondents using exhibitions and demonstrations to receive information for their Christmas tree farming.

Table 26. Use of Exhibitions and Demonstrations by Gross Annual Income of Respondents

Gross Annual Income	N	Mean	S D
\$ Less than \$ 10,000.00	2	2	0
\$ 10,000.00-\$ 20,000.00	7	1	1.5
\$ 20,000.00-\$ 40,000.00	23	1.35	.93
\$ 40,000.00-\$ 60,000.00	35	1.31	.93
\$ 60,000.00-\$ 80,000.00	13	1.69	.63
\$ 80,000.00 and above	28	1.96	.74
Total	108		

Difference between Christmas tree Growers with Farm Size Less than 15 Acres and More than 300 acres for their Use of Sources of Information

Student t-test was done to identify if there were significant differences between Christmas tree growers with Christmas tree farm size less than 15 acres and more than 300 acres for their use of Sources of Information. The results of t-test revealed significant difference between those two groups for use of pesticide companies. Christmas tree growers with more than 300 acres of Christmas tree farm size used pesticide companies significantly more than the Christmas tree growers with less than 15 acres of Christmas tree farm size. An average use of pesticide companies by the Christmas tree growers with more than 300 acres of Christmas tree farm size was 4.38 (S D. 4.42) in a year in contrast to 1.89 (S D. 2.47) times for the Christmas tree growers with Christmas tree farm size less than 15 acres. Table 27 presents the mean and standard deviation of use of each of the Sources of Information. There were no significant differences between those two groups for use of other Sources of Information.

Table 27. Results of t-test for Difference between Christmas tree Growers with Farm Size less than 15 acres and more than 300 acres for Use of Sources of Information

Sources of Information	Mean Use by Farm Size		t value	2-Tail Significance
	< 15 acres	> 300 acres		
Michigan State University Extension	1.70 S D = 2.06	2.95 S D = 3.60	-1.34	.19
Natural Resource Conservation Service	.57 S D = .76	1.44 S D = 2.36	-1.33	.19
Michigan Christmas Tree Association	2.63 S D = 2.19	2.85 S D = 2.03	-.32	.75
Christmas tree equipment industries	2.56 S D = 2.58	3.63 S D = 7.05	-.57	.57
Pesticide companies	1.89 S D = 2.47	4.38 S D = 4.42	-2.12	.04*
Friends/Neighbors/Relatives	2.78 S D = 1.83	6.59 S D = 8.43	-1.82	.09

* Significant at 0.05 α level.

Difference between Member and Nonmember Farmer Use of Sources of Information

Scores of member and nonmember farmers for the use of Sources of Information were tested for difference between these two groups. Table 28 shows the results of t-test between member and nonmember farmers for use of Sources of Information. The result revealed that there were significant differences between the groups for using information through the Michigan State University Extension and the Michigan Christmas Tree Association. Analysis showed that member farmers had mean 2.89 (SD 3.28) for the use of the Michigan State University Extension where as nonmembers had mean use 1.57 (SD 1.36) in a year. Similarly, the mean use of the MCTA for members was 3.96 (SD 3.34) where as for nonmembers the mean was .79 (SD 1.04). Table 28 shows the mean and standard deviation for member and nonmember farmers for using each of the Sources of Information.

Table 28. Results of t-test for Differences between Member and Nonmember Farmer Use of Sources of Information

Sources of Information	Mean		t value	2-Tail Significance
	Member	Nonmember		
Michigan State University Extension	2.89 SD=3.28	1.57 SD=1.36	3.24	0.00*
Natural Resource Conservation Service	1.16 SD=1.72	0.81 SD=.86	1.41	0.16
Michigan Christmas Tree Association	3.96 SD=3.34	0.79 SD=1.04	8.04	0.00*
Christmas tree equipment industries	3.17 SD=4.95	1.92 SD=2.84	1.46	0.15
Pesticide companies	3.05 SD=3.61	2.67 SD=2.58	0.60	0.55
Friends/Neighbors/Relatives	4.90 SD=5.31	3.85 SD=3.08	1.33	0.19

* Significant at 0.05 α level.

Difference between Member and Nonmember Farmer Use of Channels of Information

Table 29 shows that there were significance differences between members and nonmembers in terms of using journals/magazines/bulletins/newspapers, meetings/seminars/workshops and exhibitions/demonstrations. Use of other Channels of Information between these two groups was not found to be significantly different. Analysis showed that member farmer had mean 2.22 (SD .60) for using journals/magazines/bulletins and newspapers in contrast to the mean of 1.50 (SD .78)

for nonmembers. Similarly, members had mean use of 1.94 (SD .74) for meetings/seminars/workshops in contrast to the mean of 1.04 (SD .83) for nonmembers. Members had mean use of 1.74 (SD .75) for use of exhibitions and demonstrations in contrast to the mean of .95 (SD .94) for nonmembers.

Table 29. Results of t-test for Difference between Member and Nonmember Farmer Use of Channels of Information

Channels of Information	Mean		t value	2-Tail Significance
	Member	Nonmember		
Television	.42 SD=.63	.24 SD=.44	1.77	.08
Radio	.42 SD=.59	.29 SD=.46	1.33	.19
Telephone	1.89 SD=.95	1.73 SD=.92	.94	.35
Computer (E-mail)	.32 SD=.64	.31 SD=.66	.06	.95
Journals/Magazines/ Bulletins/Newspapers	2.22 SD=.60	1.50 SD=.78	5.78	.00*
Meetings/Seminars/ Workshops	1.94 SD=.74	1.04 SD=.83	6.44	.00*
Exhibitions/ Demonstrations	1.74 SD=.75	.95 SD=.94	5.15	.00*

* Significant at 0.05 α level.

Difference between Member and Nonmember Farmers of Michigan Christmas Tree Association for Change in Christmas Tree Farm Operation During the Last Ten Years

The responses of members and nonmembers of the Michigan Christmas Tree Association were tested for difference in the change in Christmas tree farm operation during the last ten years. Table 30 shows the result of Chi-Square test. The Chi-Square test revealed that there was no significant difference (Pearson Chi-Square = 0.30) between members and nonmembers of the MCTA for change in average size of Christmas tree farm operation during the last ten years.

Table 30. Result of Chi-Square test for Difference between Members and Nonmembers of the Michigan Christmas Tree Association for Change in Size of Christmas Tree Farm Operation During the Last Ten Years

Chi-Square	Value	DF	Significance
Pearson	2.41	2	0.30

Table 31 presents the cross tabulation for frequency distribution of member and nonmember farmers' perception about the change in their size of the Christmas tree farm during the last ten years. Table 31 shows that 43 (28.10%) members and 18 (11.77%) nonmembers of the MCTA indicated as increase in their Christmas tree farm size respectively. Thirty-six (23.54%) members and 27 (17.64%) indicated as decrease in their Christmas tree farm size respectively. Eighteen (11.76%) members and 11 (7.19%) nonmembers of the MCTA indicated as no change in their Christmas tree farm size respectively. However, it appears that members are much more likely to be increasing their operations while nonmembers are more likely decreasing.

Table 31. Cross tabulation of the Membership Status of the MCTA by Change in Size of Christmas Tree Operation During the Last Ten Years

Membership	Change in Size of Christmas trees Farm Operation			Row Total
	Increased	Decreased	No Change	
Member	43 (28.10)	36 (23.54)	18 (11.76)	97 (63.40)
Nonmember	18 (11.77)	27 (17.64)	11 (7.19)	56 (36.60)
Column Total	61 (39.87)	63 (41.18)	29 (18.95)	153 (100)

Difference between Member and Nonmember Farmers of the Michigan

Christmas Tree Association for Awareness of Michigan Snowfresh Program

The responses of members and nonmembers were tested to see if there was difference in their awareness of the Michigan Snowfresh Program of the Michigan Christmas Tree Association. The result of Chi-Square showed that there was significant difference (Pearson Chi-Square=0.00) between member and nonmember farmers for awareness of the Michigan Snowfresh Program. Further cross tabulation analysis showed that 69.80 % member farmers were aware of the Michigan Snowfresh Program in contrast to 30.20% for nonmember farmers.

Table 32. Result of Chi-Square test for Difference between Members and Nonmembers of the Michigan Christmas Tree Association for Awareness of the Michigan Snowfresh Program

Chi-Square	Value	DF	Significance
Pearson		1	0.00*

* Significant at 0.05 α level

Table 33. Cross tabulation of the Membership of the MCTA by Awareness of the Michigan Snowfresh Program

Membership	Awareness of the Michigan Snowfresh Program		Row Total
	Aware	Unaware	
Member	88 (57.89)	38 (25.00)	126 (82.89)
Nonmember	9 (5.93)	17 (11.18)	26 (17.11)
Column Total	97 (63.82)	55 (36.18)	152 (100)

Table 33 shows that 88 (57.89%) members and 9 (5.93%) nonmembers were aware of the Michigan Snowfresh Program. Thirty-eight (25%) of members and 17 (11.185) nonmembers were unaware of the Michigan Snowfresh Program. Therefore, members of the MCTA were significantly more aware of the Michigan Snowfresh Program than nonmembers of the MCTA.

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Summary

This chapter presents a brief summary of research questions, procedures used to conduct this study and results from various statistical tests. Finally, it presents the conclusion and recommendations based on the findings of the study.

Extension education organizations use a variety of methods for getting various messages across to their clients. Regardless of the involvement of dozens of organizations in extension, a common belief among extension personnel is that the Michigan State University Extension is the primary Source of Information frequently consulted and preferred by clients looking for assistance to improve their quality of life. Thus, agricultural educators/extension agents face a challenge of knowing their audience and its needs for effective and efficient dissemination of farming information. Christmas tree growers in Michigan, like other adult learners, use a variety of educational resources to meet their farming needs.

The success of an extension program depends on delivering of practical information that is useful to rural people in helping to solve their daily problems and winning the confidence of those to be served. There was need to identify and describe the Sources and Channels of Information that were considered useful and preferred by the clients. Thus this study was proposed to identify, describe and document the Sources and Channels of Information that were considered useful and preferred by the Christmas tree growers to assist in their Christmas tree farming in Michigan.

Research Questions. The following research questions were formulated to guide the study and to frame the questions to be used for gathering data through survey instrumentation:

Research Question # 1. To what extent, have the growers of Christmas tree been using different Sources and Channels of Information to solve their farming problems?

Research Question # 2. What is the perception of the growers of Christmas tree about the usefulness of different Sources and Channels of Information used for their farming needs?

Research Question # 3. Which Source(s) and Channel(s) of information do the growers of Christmas tree prefer to use or seek out for specific farming practices/concerns?

Research Question # 4a. Is there a relationship between age, Christmas tree farming experience or farm size of the growers of Christmas tree and the use of Sources of information?

Research Question # 4b. Is there a relationship between age, Christmas tree farming experience or farm size of the growers of Christmas tree and the use of Channels of information?

Research Question # 5a. Does the use of Sources of Information by growers of Christmas tree differ according to education, income, farm ownership, and type of farm?

Research Question # 5b. Does the use of Channels of Information by growers of Christmas tree differ according to education, income, farm ownership, and type of farm?

Research Question # 6. Is there a difference between members and nonmembers of the Michigan Christmas Tree Association in terms of their use of Sources of Information, use of Channels of Information, and change in their size of Christmas tree farm operation during the last ten years?

Research Question # 7. Is there a difference between members and nonmembers of the Michigan Christmas Tree Association in terms of their awareness of the Michigan Snowfresh Program?

Instrumentation of the Study. This was a descriptive study. A survey questionnaire method was used for this study. The population for this study was the growers of Christmas tree in the state of Michigan. Systematic sampling with random start was used to select the sample size of 265 out of the total population of 790 Christmas tree growers. The instrument for data collection was a mail questionnaire which was developed by considering each research question to be answered. The instrument consisted of two parts. The first part consisted of opinions regarding the use, usefulness and preference of Sources and Channels of Information to assist in their Christmas tree farming. The second part was personal and farm characteristics of the Christmas tree growers. Variables such as use of Sources of Information were measured in frequency (approximate times used per year), and use of Channels of

Information were measured with a four-point scale, (0=never use, and 3= always use). Perceptions about usefulness of Sources and Channels of Information were also measured with a four-point scale (0=of no use, and 3=Very useful). Preferences about use of Sources and Channels of Information were measured by giving multiple options to choose. Personal and farm characteristics such as age of respondents, experience in Christmas tree farming, and farm size were measured in ratio scale. Education, and income were measured with interval scale. Change in size of Christmas tree farm operation, type of farm, farm ownership, awareness of Michigan Snowfresh Program, and membership status were measured in nominal scale.

Data Analysis. Because of the descriptive nature of the study, mostly descriptive statistics-frequency, percentage, means, Pearson product moment correlation coefficients, and standard deviations were used to analyze the data. A few inferential statistics such as t-test, one-way analysis of variance, and Chi-Square tests were performed to determine significant relationships and differences. Data were analyzed by using computer software called Statistical Package for Social Science (SPSS for Windows). Alpha was set a-priori at .05.

A total of 153 (57.74%) respondents participated by providing complete information asked in the survey questionnaire. Findings showed that the average age of respondents was 54.47 years with a standard deviation of 12.94 years ranging from 17 years to 84 years. A greater proportion, 73.2%, of respondents had college or university education. The average gross annual income of the respondents was

between \$ 40, 000 to \$ 60, 000. and the highest proportion, 30.23 percent, of the respondents was under the same income level. The proportion of respondents with less than \$ 10,000 gross annual income was only 2.33 percent. While the average Christmas tree grower had 21.57 years of experience in Christmas tree farming, experience ranged from 2 years to 60 years. Ninety-seven (63.40%) of the respondents were member of the Michigan Christmas Tree Association. The majority of the respondents (82.89%) were aware of the Michigan Snowfresh program. Fifty-six (37.09%) respondents had Wholesale only farm type followed by 34 (22.52%) Choose-and-Cut only. There were 8 (5.30%) retailers. Respondents were asked to indicate the change in their size of Christmas tree farm operation during the last ten years and the response for and against was almost the same. Sixty-three (41.18%) respondents indicated decrease in their size of operation where as sixty-one (39.87%) indicated increase in their size of Christmas tree farm operation during the last ten years. Twenty-nine (18.95%) respondents indicated no change. A greater proportion, 84.31%, of the respondents had individually owned Christmas tree farms. Partnerships accounted for only 8 (5.23%) of the total respondents.

Research question one was about the use of Sources and Channels of information. The results showed that Christmas tree growers most frequently used friends/neighbors/relatives, followed by the MCTA, pesticide companies, Christmas tree equipment industries, the MSUE and the Natural Resource Conservation Service (NRCS) as Source of their Christmas tree farming information. Christmas tree growers turned to their friends/neighbors/relatives an average of 5.35 times in a year whereas

they turned 2.86 times a year to the MSUE. Although the mean use of the MSUE was lower (2.86) than friends/neighbors/relatives (5.35), it served a higher number of people, 112 (73.20%) than friends/neighbors/relatives. The reason the mean is less for the MSUE as compared to friends/neighbors/relatives was that there was a lower frequency of visits by respondents to the MSUE. Table 9 shows the frequency of contacts to various Sources per year. Uses of information through the NRCS occurred at least 1.90 times a year.

According to the criterion measure, respondents who indicated their use of radio, television, and computer were within the lowest 16% of the possible range of scores so they were not considered as used Channels of Information for Christmas tree farming.

Research question two was directed toward the perception of Christmas tree growers about the usefulness of Sources and Channels of Information. Findings revealed that more than 92.41% respondents were familiar with all identified Sources of Information. More than 84% of the respondents (within the highest 16% of the possible range) perceived the Michigan Christmas Tree Association, pesticide companies, and the Michigan State University Extension as useful Sources of Information.

More than 96.06% of the respondents were familiar with all identified Channels of Information except the computer (78.52%). Journals, magazines, bulletins, and newspapers were perceived as the useful Channels of Information by 130 (90.29%) respondents. Television was not perceived as a useful Channel of Information

by 109 (89.34%) of the total respondents.

Research question three sought to identify the preferences for Sources and Channels of Information for different aspects of Christmas tree farming. Christmas tree equipment industries, and the Natural Resource Conservation Service were not preferred Sources of Information for weed management information. Again, Christmas tree equipment industries were not preferred for fertilization, insect and disease control and marketing information. The Natural Resource Conservation Service was not preferred for four different aspects of Christmas tree equipment namely: weed management, shearing, insect and disease control, and marketing. Four of the Sources of Information were not preferred for marketing information.

None of the respondents prefer radio to receive information for fertilization, shearing , and insect and disease control. Less than ten percent of the respondents preferred television, radio, and computer to receive information for all different aspects the Christmas tree farming. Telephone was not preferred for fertilization and shearing information.

Research question 4a sought the relationship between age of respondents, experience in Christmas tree farming, or farm size and use of Sources of Information. The relationship between age of respondents and use of Sources of Information was low to negligible. The relationship of farm size with the Michigan State University Extension, the Christmas tree equipment industries, and pesticide companies was moderate. The relationship between farm size and consulting friends, neighbors and

relatives was substantial. In other words, bigger the farm size, the more Christmas tree growers tend to consult friends/neighbors/relatives. The relationship between experience of the Christmas tree growers and use of Sources of Information was low to negligible.

Research question 4b sought the relationship between age of respondents, experience in Christmas tree farming or farm size and use of Channels of Information. Again, the relationship between age of respondents, farm size and years of experience in Christmas tree farming and use of Channels of Information was low to negligible.

Research question 5a sought to identify differences in use of Sources of Information according to age, education, income, farm ownership and type of farm. The results of the one-way analysis of variance revealed no significant difference in use of Sources of Information according to education, income, and farm ownership of the respondents. Type of farm was significantly different in terms of using pesticide companies and friends/neighbors/relatives. A post hoc (Tukey's B) test identified difference between Wholesale only and Choose-and-cut only in terms of using pesticide companies and friends/neighbors/relatives. In other words, Wholesale only farms used pesticide companies and friends/neighbors/relatives significantly more than Choose-and-Cut farms.

Research question 5b sought to identify differences in use of Channels of Information according to age, education, income, farm ownership and type of farm. The results of the one-way analysis of variance revealed no significant difference in use of Channels of Information according to age, education, farm ownership and type of

farm of the respondents. Significant difference was observed between respondents with gross annual income ten to twenty thousands and more than eighty thousands for using meetings, seminars and workshops. In other words, the respondents with gross annual income with \$ 80,000 and above used meetings/seminars/workshops significantly more than the respondents having gross annual income between \$ 10,000 to 20,000. Again, there was significant difference between respondents with gross annual income forty to sixty thousands and more than eighty thousands for using exhibitions and demonstrations. In other words, respondents who have \$ 80,000 and above gross annual income used exhibitions and demonstrations significantly more than respondents with \$ 40,000 to 60,000 gross annual income.

Research question six was asked to answer whether members and nonmembers of the MCTA differ in terms of their use of Sources of Information, use of Channels of Information, and change in size of their Christmas tree farm operation during the last ten years. Student t-test showed significant difference in using the MSUE and the MCTA between the two groups. In both cases, member farmers used the MSUE and the MCTA more frequently than nonmember farmers.

Similarly, significant differences were found between members and nonmembers of the MCTA for using Channels of Information. The test results showed that there were differences in the use of journals/magazines/newspapers, meetings/seminars/workshops and exhibitions/demonstrations between members and nonmember growers. Member growers used all three categories of Channels significantly more than nonmember growers.

Chi-Square test result revealed no significant difference (Pearson Chi-Square=.30) between members and nonmembers of the MCTA for change in size of Christmas tree farm operation during the last ten years.

Research question seven was proposed to differentiate between members and nonmembers of the MCTA for awareness of the Michigan Snowfresh program. The Chi-Square test revealed that members and nonmembers were significantly different (Pearson Chi-Square=.00) for awareness of the Michigan Snowfresh program. Member growers were significantly more aware of the program than nonmembers.

Conclusions and Recommendations

The following conclusions and recommendations were drawn based on the analysis and findings of the study:

Conclusion # 1. Christmas tree growers prefer to receive information in less formal ways. Since the Christmas tree growers turned to friends, neighbors and relatives to receive Christmas tree farming information it seems that they feel more comfortable sharing their concerns about Christmas tree farming with them rather than with formal organizations and institutions like the Michigan State University Extension and the Natural Resource Conservation Service.

Recommendation # 1. Extension organizations and agencies should search out less formal ways to communicate with the Christmas tree growers. In other words agencies should direct their strategies more toward using neighborhood or community resources in a less formal approach for the dissemination of information about Christmas tree

farming. The role of non-formal organizations and institutions in extension should also be further researched.

Conclusion # 2. Christmas tree growers tended to seek information concerning their farm through more specialized professional organizations like the Michigan Christmas Tree Association. In other words the respondents consulted the organization which directly deals with production, management, and promotion of Christmas trees.

Recommendation # 2. It is recommended that the extension organizations and agencies extend farming information through those institutions like the Michigan Christmas Tree Association and pesticide companies which have already established familiarity and relationship with the Christmas tree growers.

Conclusion # 3. Christmas tree growers seemed most familiar with and preferred traditional Channels of Information such as journals, magazines, bulletins, and newspapers to receive information about the Christmas tree farming.

Recommendation # 3. Extension organizations and agencies should give more emphasis on timely publication of highly informative journals, magazines and newspapers that solve the current problems of Christmas tree growers.

Conclusion # 4. Christmas tree growers' preference to receive information through the Christmas tree equipment industries, and the Natural Resource Conservation Service is very low. Christmas tree growers did not prefer to receive information from these Sources of Information for four out of five different aspects of the Christmas tree

farming.

Recommendation # 4. Extension organizations should go through those organizations which are most preferred by Christmas tree growers. For example Christmas tree growers have a higher preference for receiving information from the MCTA.

Conclusion # 5. Contrary to the relative advantage of reaching many audiences at a time, Christmas tree growers' preference to receive information through mass media such as television, computer, and radio is very low.

Recommendation # 5. Regarding the use of the computer, a few respondents had indicated their interests on using Internet to get information related to their farming problems. It is recommended that the extension organizations train their clients on how to access information through Internet and use electronic mail. It would also be worthwhile to study the underlying causes of low preference to these mass media.

Conclusion # 6. The findings of this research support the conclusion that Christmas tree farming needs and problems are dealt with different ways between small farm size and big farm size holders.

Recommendation # 6. Therefore, extension organizations could apply various extension strategies to serve the different clientele groups.

Conclusion # 7. Membership of the MCTA tends to be a significant factor in terms of using Sources and Channels of Information, and awareness of the Michigan Snowfresh Program. Members have been using Sources and Channels of Information significantly

more than nonmembers of the MCTA. There could be three possible reasons behind this phenomena. The first possible reason could be that only those Christmas tree growers who have already developed information acquisition behavior should have joined the MCTA. The second possible reason could be that Christmas tree growers might have developed more information acquisition behavior after joining the association. The third possible reason could be the effective extension strategies of the MCTA for the production and promotion of Christmas tree industries in Michigan.

Recommendation #7. Extension organizations should try to find out key characteristics that why these two groups are different. Extension strategies should be developed to better serve the disadvantaged or weak groups.

BIBLIOGRAPHY

- Al-Howshabi, Mansour (1993). Preferred Channels of Issue-Related Information Across the First Two Stages of Innovation Adoption: Case of the Kent County Michigan State University Extension Clientele. *Ph. D. Dissertation*, Michigan State University, East Lansing.**
- Axinn, G. H. (1994). Problems faced by Extension Education with Special Reference of Nepal. Seminar Presented at Department of Agricultural and Extension Education, Michigan State University, October 3, 1994.**
- Axinn, G. H. and Thorat, Sudhakar, (1972). Modernizing World Agriculture. A comparative Study of Agricultural and Extension Education Systems. Praeger Publishers Inc. New York, USA.**
- Crawford, Harold R. (1969). Factors Affecting the Establishment of Young Farm Operators in Iowa and Implications for Agricultural Education. *Ph.D. Dissertation*, Iowa State University.**
- Dahama, O.P. (1979). Extension and Rural Welfare. Ramprasad and Sons, Agra, India.**
- Davis, (1971). Elementary Survey Analysis. Englewood Cliffs, NJ., Prentice Hall.**
- Davis, Dennis K., and Baran, Stanley J., (1981). Mass Communication and Everyday Life. A Perspective on Theory and Effects. Wadsworth Publishing Company, Belmont, California.**
- Koelling, M.R., Hart, J.B., and Leefers, L. (1992). Christmas Tree Production. Status and Potential of Michigan Agriculture-Phase II. Michigan State University Agricultural Experiment Station, Special Report No. 61.**
- Kolmer, Lee R. (1954). Delivery Systems for Continuing Education. *American Journal of Agricultural Economics*. 54 (1972), pp. 916-921.**

- Levine, S. Joseph (1987). **Unavoidable Failures: Challenges of Teaching Adults.** *Options*. Vol. 2, No. 2., pp. 2-5.
- Levine, S. Joseph (1994). **Unanticipated Learning.** *Extension Education Extra*. Department of Agricultural and Extension Education, Michigan State University. May 1994.
- Levine, S. Joseph, and Suvedi, M. (1994). **Determining Sampling Size.** A Handout provided during Practical Research Institute, May 23-June 9, 1994. Michigan State University, East Lansing, MI.
- Lingamneni, Jaganmohan Rao (1981). **Communication Channels/Sources in the Innovation-Decision Process: A Comparative Review of U. S. and India Diffusion Research.** In *Extension Education and Rural Development*, Vol. 1, pp.147-153. Edited by Bruce R. Crouch and Chamala Shankariah. Wiley & Sons, Chichester, U.K.
- Magazines (1994). **The National Farm Media Report. A Study of Media Usage and Preference by United States Farmers.** The National Association of Farm Broadcasters.
- Mahjoory, Said (1982). **The Use Of Soil Survey Information By Farmers In Five Michigan Counties.** *Ph. D. Dissertation*, Michigan State University, East Lansing.
- McLuhan, Marshall, (1964). **Understanding Media. The Extensions of Man.** McGraw-Hill Book Company, New York.
- McQuail, Denis. (1983). **Mass Communication Theory: An Introduction.** Beverly Hills, Sage Publication, London.
- Michigan Department of Agriculture (1993). **Michigan Rotational Survey. Nurseries and Christmas Trees-1993.** Michigan Agricultural Statistics Service.
- Miller, Larry E. and Smith, Keith L. (1983). **Handling Nonresponse Issues.** *Journal of Extension*. September/October, 1983.
- Obahayujie, Julius, and Hillison, John (1988). **Now Hear This Delivery Methods for Farmers.** *Journal of Extension*. Spring 1988, pp. 21-22.

- Reyes, Yonis D. (1991). Assessment of the Comparative Importance of Selected Agricultural Information Sources on Agricultural Production and Marketing Decisions. The Case Study of Ingham County Farmers.** Michigan State University, East Lansing.
- Singh, K. N., (1981). The Need for a Communication Strategy for Rural Development. In Extension and Rural Development.** Edited by Crouch, Bruce R., and Shankariah Chamala. John Wiley and Sons, New York.
- Smith, Keith L. and Kahler, Alan A. (1982). Iowa Adult Farmers' Perception***Teacher Educations in Agriculture* (1982),pp. 41-50.
- Stadlman, Neil H. (1973). Follow-up Study of Recent Young Farm Operators in Iowa. A Special Topic in Agricultural Education. Agricultural Education 590 Project.** Iowa State University.
- Tichenor, P. J., Donohue, G.A., and Olien, C.N. (1970). Mass Media Flow and Differential Growth in Knowledge. *The Public Opinion Quarterly*, Vol. XXXIV, No. 2, pp. 159-170.**
- Vergot III, Pete (1991). Southwest Michigan Fruit and Vegetable Farmers' Use of Sources and Channels to Gain Information in Regard to New Agricultural Practices. Ph. D. Dissertation,** Department of Agricultural and Extension Education, Michigan State University, East Lansing.

APPENDICES

APPENDIX A

Appendix A. Approval Letter from University Committee on
Research Involving Human Subjects'

**MICHIGAN STATE
UNIVERSITY**

July 26, 1995

TO: Krishna Mohan Shrestha
410 Agriculture Hall

RE: IRB#: 95-391
TITLE: SOURCES AND CHANNELS OF INFORMATION USED BY
GROWERS OF CHRISTMAS TREES IN THE STATE OF
MICHIGAN, USA
REVISION REQUESTED: N/A
CATEGORY: 1-C
APPROVAL DATE: 07/25/95

The University Committee on Research Involving Human Subjects' (UCRIHS) review of this project is complete. I am pleased to advise that the rights and welfare of the human subjects appear to be adequately protected and methods to obtain informed consent are appropriate. Therefore, the UCRIHS approved this project and any revisions listed above.

RENEWAL: UCRIHS approval is valid for one calendar year, beginning with the approval date shown above. Investigators planning to continue a project beyond one year must use the green renewal form (enclosed with the original approval letter or when a project is renewed) to seek updated certification. There is a maximum of four such expedited renewals possible. Investigators wishing to continue a project beyond that time need to submit it again for complete review.

REVISIONS: UCRIHS must review any changes in procedures involving human subjects, prior to initiation of the change. If this is done at the time of renewal, please use the green renewal form. To revise an approved protocol at any other time during the year, send your written request to the UCRIHS Chair, requesting revised approval and referencing the project's IRB # and title. Include in your request a description of the change and any revised instruments, consent forms or advertisements that are applicable.



OFFICE OF
**RESEARCH
AND
GRADUATE
STUDIES**

**PROBLEMS/
CHANGES:**

Should either of the following arise during the course of the work, investigators must notify UCRIHS promptly: (1) problems (unexpected side effects, complaints, etc.) involving human subjects or (2) changes in the research environment or new information indicating greater risk to the human subjects than existed when the protocol was previously reviewed and approved.

If we can be of any future help, please do not hesitate to contact us at (517) 355-2180 or FAX (517) 432-1171.

University Committee on
Research Involving
Human Subjects
(UCRIHS)

Michigan State University
232 Administration Building
East Lansing, Michigan
48824-1046

517/355-2180
FAX 517/432-1171

Sincerely,

David E. Wright
David E. Wright, Ph.D.
UCRIHS Chair

DEW:kaa/lcp

cc: S. Joseph Levine

APPENDIX B

Appendix B. Survey Instrument

Survey Questionnaire for the Study of Sources and Channels of Information used by Christmas tree Growers in the State of Michigan

Please indicate your response after careful reading of each question item. There are two parts in this survey questionnaire. The main part of this questionnaire asks for your opinions regarding the sources of information to assist in your Christmas tree farming. There are no correct answers to these questions. All responses are valuable. The second part of the questionnaire asks for information about the specifics of your farming operation. All information collected through this questionnaire will be kept entirely confidential. All information collected through this questionnaire will be presented in aggregate ways and no attempt will be made to identify specific respondents. It will take less than ten minutes to fill out the questionnaire. For your convenience a prestamped return envelope is provided. You indicate your voluntary agreement to participate by completing and returning this questionnaire. Your cooperation in completing and returning the questionnaire as soon as possible is highly appreciated.

Should you have any questions regarding this questionnaire, please feel free to contact Mr. Krishna Shrestha at (517) 355-6580 or (517) 355-2782.

Part I

Approximately how many times each year do you use each of the following agencies/organizations for information to help in your Christmas tree farming? (Please write the number of times in the space provided for each agency/organization.)

Cooperative Extension Service	_____ times/year
Soil Conservation Service	_____ times/year
Michigan Christmas Tree Association	_____ times/year
Christmas tree equipment industries	_____ times/year
Pesticide companies	_____ times/year
Friends/Neighbors/Relatives	_____ times/year
Others (Please specify)	_____ times/year
_____	_____ times/year
_____	_____ times/year

How FREQUENTLY do you use each of the following media for information to help in your Christmas tree farming? (Please check the appropriate boxes.)

	Always	Often	Rarely	Never
Television	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Radio	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Telephone	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Computer (Electronic Mail)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Journals/Magazines/Bulletins/Newspapers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Meetings/Seminars/Workshops	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Exhibitions/Demonstrations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Others (Please specify)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

How USEFUL do you find the following agencies/organizations in providing information to help in your Christmas tree farming? (Please check the appropriate boxes.)

	Very Useful	Somewhat Useful	Not Very Useful	Of no Use	Not Familiar With
Cooperative Extension Service	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Soil Conservation Service	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Michigan Christmas Tree Association	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Christmas tree equipment industries	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pesticide companies	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Friends/Neighbors/Relatives	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Others (Please specify)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

How USEFUL do you find each of the following media in providing information for your Christmas tree farming needs? (Please check the appropriate boxes.)

	Very Useful	Somewhat Useful	Not Very Useful	Of no Use	Not Familiar With
Television	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Radio	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Telephone	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Computer (Electronic Mail)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Journals/Magazines/Bulletins/Newspapers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Meetings/Seminars/Workshops	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Exhibitions/Demonstrations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Others (Please specify)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Many different agencies/organizations provide information to assist in Christmas tree farming. For each aspect of Christmas tree farming that is listed below, indicate the AGENCY/ORGANIZATION from which you PREFER to get information. (Please check all that apply.)

A. For WEED MANAGEMENT information

- ☐ Cooperative Extension Service
- ☐ Soil Conservation Service
- ☐ Michigan Christmas Tree Association
- ☐ Christmas tree equipment industries
- ☐ Pesticide companies
- ☐ Friends/Neighbors/Relatives
- ☐ Others (please specify)

B. For FERTILIZATION information

- ☐ Cooperative Extension Service
- ☐ Soil Conservation Service
- ☐ Michigan Christmas Tree Association
- ☐ Christmas tree equipment industries
- ☐ Pesticide companies
- ☐ Friends/Neighbors/Relatives
- ☐ Others (please specify)

**C. For SHEARING information
CONTROL**

- ☐ Cooperative Extension Service
 - ☐ Soil Conservation Service
 - ☐ Michigan Christmas Tree Association
 - ☐ Christmas tree equipment industries
 - ☐ Pesticide companies
 - ☐ Friends/Neighbors/Relatives
 - ☐ Others (please specify)
-
-

**D. For INSECT AND DISEASE
information**

- ☐ Cooperative Extension Service
 - ☐ Soil Conservation Service
 - ☐ Michigan Christmas Tree Association
 - ☐ Christmas tree equipment industries
 - ☐ Pesticide companies
 - ☐ Friends/Neighbors/Relatives
 - ☐ Others (please specify)
-
-

E. For MARKETING information

- ☐ Cooperative Extension Service
 - ☐ Soil Conservation Service
 - ☐ Michigan Christmas Tree Association
 - ☐ Christmas tree equipment industries
 - ☐ Pesticide companies
 - ☐ Friends/Neighbors/Relatives
 - ☐ Others (please specify)
-
-

Information about Christmas tree farming is available through many different CHANNELS. For each aspect of Christmas tree farming that is listed below, indicate the CHANNEL(S) through which you PREFER to receive information. (Please check all that apply.)

A. For WEED MANAGEMENT information

- ☐ Television
 - ☐ Radio
 - ☐ Telephone
 - ☐ Computer(Electronic mail)
 - ☐ Journals/Magazines/Bulletins/Newspapers
 - ☐ Meetings/Seminars/Workshops
 - ☐ Exhibitions/Demonstrations
 - ☐ Others (Please specify)
-
-

B. For FERTILIZATION information

- ☐ Television
 - ☐ Radio
 - ☐ Telephone
 - ☐ Computer(Electronic mail)
 - ☐ Journals/Magazines/Bulletins/Newspapers
 - ☐ Meetings/Seminars/Workshops
 - ☐ Exhibitions/Demonstrations
 - ☐ Others (Please specify)
-
-

C. For SHEARING information

- ☐ Television
 - ☐ Radio
 - ☐ Telephone
 - ☐ Computer(Electronic mail)
 - ☐ Journals/Magazines/Bulletins/Newspapers
 - ☐ Meetings/Seminars/Workshops
 - ☐ Exhibitions/Demonstrations
 - ☐ Others (Please specify)
-
-

**D. For INSECT AND DISEASE
CONTROL information**

- ☐ Television
 - ☐ Radio
 - ☐ Telephone
 - ☐ Computer(Electronic mail)
 - ☐ Journals/Magazines/Bulletins/Newspapers
 - ☐ Meetings/Seminars/Workshops
 - ☐ Exhibitions/Demonstrations
 - ☐ Others (Please specify)
-
-

E. For MARKETING information

- ☐ Television
☐ Radio
☐ Telephone
☐ Computer(Electronic mail)
☐ Journals/Magazines/Bulletins/Newspapers
☐ Meetings/Seminars/Workshops
☐ Exhibitions/Demonstrations
☐ Others (Please specify)
-
-

Part II

Please state your date of birth: _____ year.

Please check the box that best describes your educational background.

- ☐ Less than high school graduate
☐ High school graduate
☐ Some college education
☐ Community/Junior college graduate
☐ College/University graduate

Please check the box that best describes your gross income of your family in a year?

- ☐ less than \$ 10,000.00
☐ \$ 10,000 to \$ 20,000.00
☐ \$ 20,000 to \$ 40,000.00
☐ \$ 40,000 to \$ 60,000.00
☐ \$ 60,000 to \$ 80,000.00
☐ \$ 80,000 and above

How long have you been growing Christmas tree? _____ years.

What is the size of your Christmas tree operation? _____ acres.

How has the size of your Christmas tree farm changed during the last ten years?

- ☐ Increased
☐ Decreased
☐ No Change

Please check the box by the type of your farm ownership.

- ☐ Own
☐ Partnership
☐ Other (please specify).....

Please check the appropriate box that best describes your Christmas tree farm type.

- ☐ Wholesale
- ☐ Choose-and-Cut
- ☐ Retail
- ☐ Other (please specify).....

Are you aware of the Michigan Snowfresh program?

- ☐ Yes
- ☐ No

Thank you for participating in this study. Please return the completed survey questionnaire to:

**Krishna Shrestha
Department of Agricultural and Extension Education
410 Agriculture Hall
Michigan State University
East Lansing, MI 48824-1039**

APPENDIX C

Appendix C. Cover Letter

August 2, 1995

1.....
2.....
3.....

Dear 4.....

I am writing on behalf of Mr. Krishna Shrestha, a graduate student in the Department of Agricultural and Extension Education at Michigan State University. Mr. Shrestha is from Nepal and he is interested in Christmas tree farming. He wants to investigate the different information and media sources that Michigan Christmas tree growers consult to solve some of their educational needs. Specifically he is interested in identifying preferred information sources and channels through which you obtain Christmas tree farming information. Results from this study will help in identifying those information sources and channels which best serve Michigan Christmas tree producers. On his behalf I ask that each of you take a few minutes to fill out the enclosed survey questionnaire and return it directly to him in the prestamped envelope. It will take less than ten minutes to fill out this survey questionnaire. You have been selected at random from Michigan growers to participate in this survey, so your response is important.

I appreciate your assistance. Your response is strictly confidential. Should you have any questions, please call Mr. Krishna Shrestha at (517) 355-2782.

Thanks again for your assistance in responding in a timely manner.

With best regards,

**Dr. Melvin R. Koelling
Advisor
Michigan Christmas Tree Association
Department of Forestry
Michigan State University
East Lansing, MI 48824**

APPENDIX D

Appendix D. Reminder Letter

October 2, 1995

1.....
2.....
3.....

Dear Christmas Trees Grower:

Three weeks ago, I sent you the second mail seeking your opinion regarding the use of sources and channels of information to assist in your Christmas tree farming. Your opinion is extremely important for successful completion of my research study. To date, I have received about 55 percent response from other Christmas tree growers. Please take a few minutes to complete the questionnaire and return in the envelope previously provided. In the event, if you have lost or misplaced the survey questionnaire, please feel free to call me at (517) 355-6580 or (517) 355-2782.

I expect your response as soon as possible.

Your cooperation will be very much appreciated.

Sincerely,

**Krishna Shrestha
Department of Agricultural and Extension Education
410 Agriculture Hall
Michigan State University
East Lansing, MI 48824-1039**

APPENDIX E

Appendix E. Results of ANOVA for Demographic Characteristics and Use of Sources of Information

One-way Analysis of Variance for Sources of Information and Age, Education, Income, Farm Ownership, and Farm Type

A. Age of Respondents and Use of Sources of Information

1. Variable P1Q1A Use of Cooperative Extension Service.

By Variable P2Q1B Age Distribution of Respondents

Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	3	17.64	5.88	.73	.54
Within Groups	125	1007.59	8.06		
Total	128	1025.22			

- No two groups are significantly different at the .05 level

2. Variable P1Q1B Use of Soil Conservation Service.

By Variable P2Q1B Age Distribution of Respondents

Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	3	5.22	1.74	.85	.47
Within Groups	98	200.74	2.05		
Total	101	205.96			

- No two groups are significantly different at the .05 level

3. Variable P1Q1C Use of the MCTA.

By Variable P2Q1B Age Distribution of Respondents

Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	3	38.02	12.67	1.20	.31
Within Groups	118	1246.37	10.56		
Total	121	1284.39			

- No two groups are significantly different at the .05 level

4. Variable P1Q1D Use of Christmas tree equipment industries
By Variable P2Q1B Age Distribution of Respondents
Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	3	37.78	12.59	.63	.60
Within Groups	116	2313.68	19.95		
Total	119	2351.47			

- No two groups are significantly different at the .05 level

5. Variable P1Q1E Use of Pesticide companies.
By Variable P2Q1B Age Distribution of Respondents
Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	3	41.62	13.87	1.28	.29
Within Groups	122	1326.09	10.87		
Total	125	1367.71			

- No two groups are significantly different at the .05 level

6. Variable P1Q1F Use of Friends/Neighbors/Relatives.
By Variable P2Q1B Age Distribution of Respondents
Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	3	143.03	47.68	2.24	.09
Within Groups	107	2274.66	21.26		
Total	110	2417.69			

- No two groups are significantly different at the .05 level

B. Education and Use of Sources of Information

1. Variable P1Q1A Use of Cooperative Extension Service.
By Variable P2Q2 Participants' educational level
Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	4	23.11	5.78	.71	.59
Within Groups	125	1016.77	8.13		
Total	129	1039.88			

- No two groups are significantly different at the .05 level

2. Variable P1Q1B Use of Soil Conservation Service.
 By Variable P2Q2 Participants' educational level
 Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	4	5.57	1.39	.62	.65
Within Groups	97	218.07	2.25		
Total	101	223.65			

- No two groups are significantly different at the .05 level

3. Variable P1Q1C Use of the MCTA.
 By Variable P2Q2 Participants' educational level
 Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	4	18.26	4.57	.42	.79
Within Groups	118	1268.15	10.75		
Total	122	1286.41			

- No two groups are significantly different at the .05 level

4. Variable P1Q1D Use of Christmas tree equipment industries
 By Variable P2Q2 Participants' educational level
 Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	4	89.22	22.31	1.14	.34
Within Groups	115	2253.37	19.59		
Total	119	2342.59			

- No two groups are significantly different at the .05 level

5. Variable P1Q1E Use of Pesticide companies.
 By Variable P2Q2 Participants' educational level
 Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	4	10.32	2.58	.23	.92
Within Groups	121	1349.55	11.15		
Total	125	1359.87			

- No two groups are significantly different at the .05 level

6. Variable P1Q1F Use of Friends/Neighbors/Relatives.
 By Variable P2Q2 Participants' educational level
 Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	4	39.00	9.75	.43	.78
Within Groups	105	2365.77	22.53		
Total	109	2404.76			

- No two groups are significantly different at the .05 level

C. Respondents Income and Use of Sources of Information

1. Variable P1Q1A Use of Cooperative Extension Service.
 By Variable P2Q3 Participants' gross income in a year.
 Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	5	48.09	9.62	1.06	.39
Within Groups	103	933.95	9.07		
Total	108	982.04			

- No two groups are significantly different at the .05 level

2. Variable P1Q1B Use of Soil Conservation Service.
 By Variable P2Q3 Participants' gross income in a year.
 Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	5	5.36	1.07	.42	.84
Within Groups	81	208.23	2.57		
Total	86	213.59			

- No two groups are significantly different at the .05 level

3. Variable P1Q1C Use of the MCTA.
 By Variable P2Q3 Participants' gross income in a year.
 Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	5	109.19	21.84	1.98	.09
Within Groups	101	1113.24	11.02		
Total	106	1222.43			

- No two groups are significantly different at the .05 level

4. Variable P1Q1D Use of Christmas tree equipment industries
 By Variable P2Q3 Participants' gross income in a year.
 Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	5	124.47	24.89	1.12	.35
Within Groups	98	2176.52	22.21		
Total	103	2300.99			

- No two groups are significantly different at the .05 level

5. Variable P1Q1E Use of Pesticide companies.
 By Variable P2Q3 Participants' gross income in a year.
 Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	5	94.10	18.82	1.59	.17
Within Groups	104	1232.46	11.85		
Total	109	1326.55			

- No two groups are significantly different at the .05 level

6. Variable P1Q1F Use of Friends/Neighbors/Relatives.
 By Variable P2Q3 Participants' gross income in a year.
 Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	5	182.19	36.44	1.55	.18
Within Groups	88	2069.86	23.52		
Total	93	2252.05			

- No two groups are significantly different at the .05 level

D. Farm Ownership and Use of Sources of Information

1. Variable P1Q1A Use of Cooperative Extension Service.
 By Variable P2Q7 Type of farm ownership.
 Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	2	1.38	.69	.08	.92
Within Groups	126	1036.31	8.22		
Total	128	1037.69			

- No two groups are significantly different at the .05 level

2. Variable P1Q1B Use of Soil Conservation Service.
 By Variable P2Q7 Type of farm ownership.
 Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	2	1.24	.62	.27	.76
Within Groups	98	223.51	2.28		
Total	100	224.75			

- No two groups are significantly different at the .05 level

3. Variable P1Q1C Use of the MCTA.
 By Variable P2Q7 Type of farm ownership.
 Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	2	24.90	12.45	1.18	.31
Within Groups	119	1259.43	10.58		
Total	121	1284.34			

- No two groups are significantly different at the .05 level

4. Variable P1Q1D Use of Christmas tree equipment industries
 By Variable P2Q7 Type of farm ownership.
 Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	2	17.26	8.63	.43	.65
Within Groups	116	2327.29	20.06		
Total	118	2344.55			

- No two groups are significantly different at the .05 level

5. Variable P1Q1E Use of Pesticide companies.
 By Variable P2Q7 Type of farm ownership.
 Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	2	1.62	.81	.07	.93
Within Groups	122	1362.74	11.17		
Total	124	1364.35			

- No two groups are significantly different at the .05 level

6. Variable P1Q1F Use of Friends/Neighbors/Relatives.
 By Variable P2Q7 Type of farm ownership.
 Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	2	100.83	50.42	2.33	.10
Within Groups	106	2295.40	21.65		
Total	108	2396.24			

- No two groups are significantly different at the .05 level

E. Farm Type and Use of Sources of Information

1. Variable P1Q1A Use of Cooperative Extension Service.
 By Variable P2Q8 Type of Christmas tree farm.
 Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	5	37.99	7.60	.93	.47
Within Groups	122	999.62	8.19		
Total	127	1037.62			

- No two groups are significantly different at the .05 level

- Group 1. Wholesale only
- Group 2. Choose-and-Cut only
- Group 3. Retail
- Group 4. Wholesale and Choose-and-Cut
- Group 5. Wholesale and Retail
- Group 6. Wholesale, Choose-and-Cut, and Retail

2. Variable P1Q1B Use of Soil Conservation Service.
 By Variable P2Q8 Type of Christmas tree farm.
 Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	5	16.03	3.21	1.46	.21
Within Groups	95	208.72	2.20		
Total	100	224.75			

- No two groups are significantly different at the .05 level

3. Variable P1Q1C Use of the MCTA.
 By Variable P2Q8 Type of Christmas tree farm.
 Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	5	19.64	3.93	.36	.88
Within Groups	115	1255.53	10.92		
Total	120	1275.17			

- No two groups are significantly different at the .05 level

4. Variable P1Q1D Use of Christmas tree equipment industries
 By Variable P2Q8 Type of Christmas tree farm.
 Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	5	66.07	13.21	.66	.66
Within Groups	113	2274.86	20.13		
Total	118	2340.92			

- No two groups are significantly different at the .05 level

5. Variable P1Q1E Use of Pesticide companies.
 By Variable P2Q8 Type of Christmas tree farm.
 Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	5	136.30	27.26	2.63	.03*
Within Groups	119	1234.55	10.37		
Total	124	1370.85			

(*) Indicates significant differences.

Group 1. Wholesale only*

Group 2. Choose-and-Cut only*

Group 3. Retail

Group 4. Wholesale and Choose-and-Cut

Group 5. Wholesale and Retail

Group 6. Wholesale, Choose-and-Cut, and Retail

6. Variable P1Q1F Use of Friends/Neighbors/Relatives.
 By Variable P2Q8 Type of Christmas tree farm.
 Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	5	260.54	52.11	2.53	.03*
Within Groups	105	2159.03	20.56		
Total	110	2419.57			

(*) Indicates significant differences.

Group 1. Wholesale only*

Group 2. Choose-and-Cut only*

Group 3. Retail

Group 4. Wholesale and Choose-and-Cut

Group 5. Wholesale and Retail

Group 6. Wholesale, Choose-and-Cut, and Retail

APPENDIX F

Appendix F. Results of ANOVA for Demographic Characteristics and Use of Channels of Information

One-way Analysis of Variance for Channels of Information and Age, Education, Income, Farm Ownership, and Farm Type

A. Respondents age and Use of Channels of Information

1. Variable P1Q2A Use of television.
By Variable P2Q1B Age Distribution of Respondents
Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	3	2.39	.80	2.47	.07
Within Groups	113	36.53	.32		
Total	116	38.92			

- No two groups are significantly different at the .05 level

2. Variable P1Q2B Use of radio.
By Variable P2Q1B Age Distribution of Respondents
Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	3	1.50	.50	1.66	.18
Within Groups	112	33.81	.30		
Total	115	35.31			

- No two groups are significantly different at the .05 level

3. Variable P1Q2C Use of telephone.
By Variable P2Q1B Age Distribution of Respondents
Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	3	3.61	1.20	1.36	.26
Within Groups	120	105.83	.88		
Total	123	109.44			

- No two groups are significantly different at the .05 level

4. Variable P1Q2D Use of computer (e-mail).
By Variable P2Q1B Age Distribution of Respondents
Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	3	2.46	.82	2.15	.10
Within Groups	108	41.22	.38		
Total	111	43.68			

- No two groups are significantly different at the .05 level

5. Variable P1Q2E Use of Journals/Magazines/Bulletins/News
By Variable P2Q1B Age Distribution of Respondents
Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	3	.24	.08	.13	.94
Within Groups	142	87.73	.62		
Total	145	87.97			

- No two groups are significantly different at the .05 level

6. Variable P1Q2F Use of Meetings/Seminars/Workshops.
By Variable P2Q1B Age Distribution of Respondents
Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	3	.31	.10	.12	.95
Within Groups	129	109.13	.85		
Total	132	109.44			

- No two groups are significantly different at the .05 level

7. Variable P1Q2G Use of Exhibitions/Demonstrations.
By Variable P2Q1B Age Distribution of Respondents
Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	3	.50	.17	.20	.90
Within Groups	119	98.20	.83		
Total	122	98.70			

- No two groups are significantly different at the .05 level

B. Respondents Education and Use of Channels of Information

1. Variable P1Q2A Use of television.
By Variable P2Q2 Participants' educational level
Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	4	1.12	.28	.83	.51
Within Groups	114	38.34	.34		
Total	118	39.46			

- No two groups are significantly different at the .05 level

2. Variable P1Q2B Use of radio.
By Variable P2Q2 Participants' educational level
Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	4	1.95	.49	1.62	.17
Within Groups	113	33.89	.30		
Total	117	35.84			

- No two groups are significantly different at the .05 level

3. Variable P1Q2C Use of telephone.
By Variable P2Q2 Participants' educational level
Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	4	6.25	1.56	1.80	.13
Within Groups	121	105.25	.87		
Total	125	111.50			

- No two groups are significantly different at the .05 level

4. Variable P1Q2D Use of computer (e-mail).
By Variable P2Q2 Participants' educational level
Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	4	1.57	.39	.95	.44
Within Groups	109	45.06	.41		
Total	113	46.63			

- No two groups are significantly different at the .05 level

5. Variable P1Q2E Use of Journals/Magazines/Bulletins/News
By Variable P2Q2 Participants' educational level
Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	4	1.37	.34	.56	.69
Within Groups	142	86.60	.61		
Total	146	87.97			

- No two groups are significantly different at the .05 level

6. Variable P1Q2F Use of Meetings/Seminars/Workshops.
By Variable P2Q2 Participants' educational level
Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	4	5.49	1.37	1.70	.15
Within Groups	130	104.84	.81		
Total	134	110.33			

- No two groups are significantly different at the .05 level

7. Variable P1Q2G Use of Exhibitions/Demonstrations.
By Variable P2Q2 Participants' educational level
Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	4	6.48	1.62	2.10	.09
Within Groups	120	92.72	.77		
Total	124	99.20			

- No two groups are significantly different at the .05 level

C. Respondents Income and Use of Channels of Information

1. Variable P1Q2A Use of television.
By Variable P2Q3 Participants' gross income in a year.
Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	5	1.79	.36	1.00	.42
Within Groups	96	34.29	.36		
Total	101	36.09			

- No two groups are significantly different at the .05 level

2. Variable P1Q2B Use of radio.
By Variable P2Q3 Participants' gross income in a year.
Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	5	1.87	.37	1.19	.32
Within Groups	95	29.83	.31		
Total	100	31.70			

- No two groups are significantly different at the .05 level

3. Variable P1Q2C Use of telephone.
By Variable P2Q3 Participants' gross income in a year.
Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	5	5.15	1.03	1.13	.35
Within Groups	101	91.83	.91		
Total	106	96.97			

- No two groups are significantly different at the .05 level

4. Variable P1Q2D Use of computer (e-mail).
By Variable P2Q3 Participants' gross income in a year.
Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	5	3.54	.71	1.61	.16
Within Groups	93	40.79	.44		
Total	98	44.32			

- No two groups are significantly different at the .05 level

5. Variable P1Q2E Use of Journals/Magazines/Bulletins/News
By Variable P2Q3 Participants' gross income in a year.
Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	5	3.27	.66	1.10	.36
Within Groups	119	70.69	.59		
Total	124	73.97			

- No two groups are significantly different at the .05 level

6. Variable P1Q2F Use of Meetings/Seminars/Workshops.
By Variable P2Q3 Participants' gross income in a year.
Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	5	10.54	2.11	2.64	.03*
Within Groups	108	86.09	.80		
Total	113	96.63			

(*) Indicates significant differences which are shown in the lower triangle

7. Variable P1Q2G Use of Exhibitions/Demonstrations.
By Variable P2Q3 Participants' gross income in a year.
Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	5	10.42	2.08	2.78	.02
Within Groups	102	76.49	.75		
Total	107	86.92			

(*) Indicates significant differences which are shown in the lower triangle

D. Farm Ownership and Use of Channels of Information

1. Variable P1Q2A Use of television.
By Variable P2Q7 Type of farm ownership.
Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	2	.99	.49	1.49	.23
Within Groups	114	37.65	.33		
Total	116	38.63			

- No two groups are significantly different at the .05 level

2. Variable P1Q2B Use of radio.
 By Variable P2Q7 Type of farm ownership.
 Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	2	.04	.02	.07	.93
Within Groups	113	32.75	.29		
Total	115	32.79			

- No two groups are significantly different at the .05 level

3. Variable P1Q2C Use of telephone.
 By Variable P2Q7 Type of farm ownership.
 Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	2	.11	.05	.06	.94
Within Groups	121	109.34	.90		
Total	123	109.44			

- No two groups are significantly different at the .05 level

4. Variable P1Q2D Use of computer (e-mail).
 By Variable P2Q7 Type of farm ownership.
 Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	2	1.62	.81	1.97	.14
Within Groups	109	44.81	.41		
Total	111	46.43			

- No two groups are significantly different at the .05 level

5. Variable P1Q2E Use of Journals/Magazines/Bulletins/News
 Variable P2Q7 Type of farm ownership.
 Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	2	.51	.25	.43	.65
Within Groups	143	85.38	.60		
Total	145	85.89			

- No two groups are significantly different at the .05 level

6. Variable P1Q2F Use of Meetings/Seminars/Workshops.
By Variable P2Q7 Type of farm ownership.
Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	2	1.88	.94	1.12	.33
Within Groups	130	108.79	.84		
Total	132	110.68			

- No two groups are significantly different at the .05 level

7. Variable P1Q2G Use of Exhibitions/Demonstrations.
By Variable P2Q7 Type of farm ownership.
Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	2	2.35	1.18	1.44	.24
Within Groups	121	98.52	.81		
Total	123	100.87			

- No two groups are significantly different at the .05 level

E. Farm Type and Use of Channels of Information

1. Variable P1Q2A Use of television.
Variable P2Q8 Type of Christmas tree farm.
Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	5	2.28	.46	1.38	.24
Within Groups	110	36.51	.33		
Total	115	38.79			

- No two groups are significantly different at the .05 level

2. Variable P1Q2B Use of radio.
By Variable P2Q8 Type of Christmas tree farm.
Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	5	1.12	.22	.77	.57
Within Groups	109	31.54	.29		
Total	114	32.66			

- No two groups are significantly different at the .05 level

3. Variable P1Q2C Use of telephone.
By Variable P2Q8 Type of Christmas tree farm.
Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	5	8.95	1.79	2.11	.07
Within Groups	117	99.11	.85		
Total	122	108.07			

- No two groups are significantly different at the .05 level

4. Variable P1Q2D Use of computer (e-mail).
By Variable P2Q8 Type of Christmas tree farm.
Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	5	5.71	1.14	2.98	.01
Within Groups	105	40.26	.38		
Total	110	45.96			

5. Variable P1Q2E Use of Journals/Magazines/Bulletins/News
By Variable P2Q8 Type of Christmas tree farm.
Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	5	3.48	.69	1.17	.33
Within Groups	139	82.41	.59		
Total	144	85.89			

- No two groups are significantly different at the .05 level

6. Variable P1Q2F Use of Meetings/Seminars/Workshops.
By Variable P2Q8 Type of Christmas tree farm.
Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	5	5.59	1.12	1.38	.24
Within Groups	126	102.38	.81		
Total	131	107.97			

- No two groups are significantly different at the .05 level

7. Variable P1Q2G Use of Exhibitions/Demonstrations.
 By Variable P2Q8 Type of Christmas tree farm.
 Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	5	2.17	.43	.53	.75
Within Groups	116	94.25	.81		
Total	121	96.43			

- No two groups are significantly different at the .05 level

MICHIGAN STATE UNIV. LIBRARIES



31293014101640