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**THE USE OF SOIL SURVEY INFORMATION BY FARMERS IN FIVE
MICHIGAN COUNTIES**

Michigan State University

Ph.D. 1982

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THE USE OF SOIL SURVEY INFORMATION BY FARMERS
IN FIVE MICHIGAN COUNTIES

By

Saïd Mahjoory

A DISSERTATION

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

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Agriculture and Natural Resources

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ABSTRACT

THE USE OF SOIL SURVEY INFORMATION BY FARMERS IN FIVE MICHIGAN COUNTIES

By

Saïd Mahjoory

The primary purpose of this study was to examine the use of soil survey report information by Michigan farmers and the relationship of its use to farmers and farm characteristics. Farmer characteristics used were occupation, age, level of farmal education and years in farming. Farm characteristics used were size of farm and type of farm.

A mail questionnaire was developed and mailed to 500 persons whose names were obtained from the Agriculture Stabilization and Conservation Service in five selected Michigan counties. The names were chosen by random based on an assigned quota of farmers in each county. In addition, the county directors (Cooperative Extension Service and Soil Conservation Service) in each county were interviewed by telephone after a list of specific questions had been mailed to them.

The major findings from the research were:

1. The farmers who most frequently reported they were aware of soil survey reports were the farmers who were on the larger farms and those who had the higher levels of schooling.
2. Approximately one-fourth of the active farmers reported having used the soil survey report information. All users of the reports indicated the reports were helpful.

3. The farmers with the highest levels of schooling and those on the largest farm were the ones who most frequently reported use of soil survey report information.
4. The highest levels of interest in attending educational meetings about soil survey report information were expressed by (a) farmers on large farms; (b) younger farmers; and (c) cash crop farmers.
5. The distance the farmers were willing to travel to attend educational meetings was positively related to the age of the farmers.
6. The farmers on dairy farms preferred shorter educational sessions than did farmers on other types of farms.
7. "Other farmers" were most frequently cited as a source of information for individuals who discussed their soil problems.

Recommendations included suggestions concerning how to obtain additional use of the soil survey reports. Some of the recommended procedures were: meetings to be conducted by the Cooperative Extension Service; and providing information about soil survey reports to "other sources" frequently used by farmers.

TO

My wife, HOSNY,
for her constant encouragement and support throughout the many years
of my education.

TO

My son, ARASTOU, and my daughter, AMY.

TO

FREEDOM and PEACE for the world.

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In conducting this study and writing this dissertation, I have had the supervision and personal tutorial help of my advisor, Dr. Donald Meaders,. He has prodded me into thinking through a problem, recognizing what is important and what is extraneous and guided me in carrying out the work that needed to be done. I thank him for his concern, his knowledge, his dynamic and imaginative approach to research. I express my appreciation also to the members of my guidance committee, Dr. Frank Bobbitt, Dr. Ben. Bohnhorst and Dr. L.S. Robertson, from whose courses, informal conferences, and questioning I have gained much. The opportunity to associate with these distinguished scholars has been an enlightening experience.

I am also grateful to the County Cooperative Extension and Soil Conservation Service District directors for sharing their knowledge and experience and for their help and Cooperation in collection of the data.

For financial assistance in carrying out this research study I would to like thank Dr. Donald Meaders, my advisor; Dr. Carroll Wamhoff, director of the Agriculture and Natural Resource Education Institute and Dr. Delbert Mokma, professor in the crop and Soil Science Department who also provided his very valuable comments and advice.

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CHAPTER I

INTRODUCTION

Good use, conservation and improvement of soil is considered fundamental to agricultural production now and for the future. Toward this end much research on soils has been conducted throughout the world during the past 75-100 years. Yet soil erosion, soil compaction, and other problems persist even in developed countries, suggesting that optimal use is not being made of research available. The study reported in the following pages is one attempt to determine farmers' use of soil survey reports in one state (Michigan) of an agriculturally advanced nation (United States).

The importance of good soil practices, now and in the future, becomes apparent in considering their impact on agricultural production and, thus, food supply. A report published by the Food and Agriculture Organization (F.A.O.) of the United Nations indicates that between 300 and 500 million people suffer from actual lack of food.^{1*} Unless drastic action is taken, more millions are expected to join them in the future as the result of rapid increases in world population. Knowledge and understanding of the magnitude of the hunger problem is perhaps the first step toward its solution.

^{1*} The numbers refer to sources which are located in the footnotes at the end of each chapter.

Many years of experience and research in the production of food and fiber in all parts of the world have provided a tremendous store of information that can and must be applied to increasing the quantity and improving the quality of agricultural production to overcome food shortages. In this matter the need to conserve and protect arable lands is paramount.

The world-wide problem of hungry people is a strong incentive to leaders in education and agriculture to provide agricultural education to youth and adults. Agricultural education should be considered a life-long process and be made available to all people involved in agricultural production. ²

Access to Soil Survey Report Information

Agricultural progress depends upon people's knowledge, understanding and action to bring about beneficial change. Change in agricultural practices depends to a significant extent upon farmers' access to accurate and reliable information and to incentives which are available to encourage them to adopt improved practices.

The United States' system of agricultural research and education is based on two principles: scientific investigation of problems and publication of the results of research; and formal and non-formal education to provide access to the knowledge by people who want and need it. ³

One of the requirements for a strong agricultural sector is that farmers should know about their soil, its management and the proper use of fertilizers. Today's farmers in most parts of the United States have access to studies and surveys which identify soils, their locations and their use. These surveys contain information about land problems and the location of those problems. Misuse of soils can seriously hinder agricultural development, but their conservation and improvement can help advance the economic progress of any nation. Soil can be conserved without improvement, but cannot be improved without conservation. It is like a living thing-feed it right and treat it right, and it improves like any living thing and produces more while it is improving. ⁴

In the interests of optimal soil use, a major function of soil scientists in the Soil Conservation Service, U.S. Department of Agriculture (USDA) and cooperating agencies is to map, to classify and to delineate best soil usage. The USDA began surveying land in Allegan County, Michigan in 1901. ⁵

Motivations for the Study

The motivation for this study comes in part from the author's background and work in soil genesis and classification. This includes several years in soil survey activities within the scope of the cooperative survey programs of the Soil Conservation Service, the Michigan State Agricultural Experiment station and other agencies.

Additional motivation comes from a concern about the effectiveness of educational programs in training farmers in the use of soil survey reports. Finally, the researcher is motivated by comprehension of a rapidly increasing world population's need for more food, shelter, and clothing and feels soil survey information can be effective in helping farmers improve farm management and agricultural productivity to meet these needs.

Objectives

The objectives of this study are to determine:

1. The extent to which Michigan farmers are aware of published soil survey reports;
2. The characteristics of Michigan farmers/farms using soil survey information (level of formal education, years in farming, occupation, age, size of farm and type of farm);
3. The extent to which Michigan farmers believe use of soil survey report information is important in improving agriculture in Michigan;
4. The extent to which Michigan farmers are interested in attending soil survey report educational programs; and
5. The extent to which Michigan farmers believe they have received help in using soil survey reports from several farmer-serving organizations and agencies.

Hypotheses

The review of literature, as well as personal observations by the author, led to the formulation of five hypotheses related to the objectives of the study. In general, it is believed, that a positive relationship exists between the use of soil survey report information and...

farmer/farm characteristics and knowledge of published modern soil survey reports;

selected characteristics of Michigan farmers;

selected characteristics of Michigan farms;

farmers perceptions about improving agriculture in Michigan;

Michigan farmers interest in attending soil survey report educational programs;

Limitations

This study is designed to identify the usefulness of soil survey report information as perceived by Michigan farmers. It is not intended to illustrate technical procedures in preparing or improving soil survey reports, but will examine perceptions of farmers as to the help they receive from selected farmer-serving organizations. Actual soil practices used by farmers will not be studied, but the need for additional assistance in using soil survey information will be examined through information received from farmers and representatives of farmer-serving organizations.

Definition of Terms

Soil Survey: The systematic examination of soils in the field and in laboratories; their description and classification; the mapping of kinds of soil; the interpretation of soils according to their adaptability to their adaptability for various crops, grasses, and trees; behavior of soils under use or treatment for plant production or for other purposes; and their productivity under different management systems. ⁶

Soil Survey Report: A publication based on a soil survey and containing a description of the soils and related information, their suggested uses or management in addition to a soil map of the area covered by the soil survey. ⁷

Soil Map: A map showing the distribution of various soil types or other soil characteristics included in the mapping in relation to the prominent physical and cultural features of the earth's surface. Five kinds of soil maps are recognized in the U.S.: detailed, detailed reconnaissance, reconnaissance, generalized, and schematic. ⁸

Soil Productivity: The capacity of a soil in its normal environment for producing a specified plant or sequence of plants under a specified system of management. ⁹

Soil Fertility: The quality of a soil that enables it to provide nutrients in adequate amounts and in proper balance for the growth of specified plants, when other growth factors, such as light, moisture, temperature, and physical condition of soil, are favorable. ¹⁰

Soil Improvements: The processes or the results of making the soil more productive for growing plants by drainage, irrigation, addition of fertilizers and soil amendments, and other methods. ¹¹

Soil Conservation: The protection, improvement, and use of soils according to principles that will assure their highest economic or social benefits, now and in the future. ¹²

Farm Management: The organization and administration of farm resources, including land, labor, crops, livestock, and equipment. ¹³

Farm: According to Agricultural Stabilization and Conservation Service (ASCS) principles, a farm can be defined as a tract operated by an individual. ¹⁴
According to the 1974 Agricultural Census a farm is defined with criteria for number of acres and minimum value of agricultural products. ¹⁵

Soil Management: The human element in agricultural production which defines problems, establishes yield goals, accumulates and analyses information pertinent to the solution of the problem, reaches decisions, acts on those decisions and bears the responsibility for those actions as they relate to soils. ¹⁶

Cooperative Extension Service: A program created in 1914 with the passage of the federal Smith-Lever Act. "Cooperative", in the case of the Extension Service, refers to joint financing by federal, state, and county governments. "Extension" refers to the programs' extension of university resources beyond the campus. The Cooperative Extension Service is an integral part of Land Grant University programs, with representatives living in local communities and closely related to people and their problems. ¹⁷

Soil Conservation Service: A program administered by the United States Department of Agriculture (USDA) which provides technical assistance and help to farmers and others in using soil resources. ¹⁸

Vocational Agriculture: An educational program through local public schools to provide youth and adults with instruction to assist them to make a beginning or to advance in the business of agriculture. The program includes instruction for both farm and non-farm occupations which require skill and knowledge of agriculture. ¹⁹

Formal Education: An institutionalized, chronologically graded and structured system which is characterized by rules and regulations, paid faculty and a set curriculum. ²⁰

Non-Formal Education: Any organized, systematic, educational activity carried on outside of the formal schooling system. It includes assessing the needs and interests of adult and out-of-school youth, communicating with them, motivating them to participate, helping them to acquire necessary skills, to adopt behavioral patterns, and participate in activities to increase their productivity and improve their living standards. ²¹

Informal Education: The lifelong process by which every person acquires and accumulates knowledge, skills, attitudes and insight from daily experience and exposure to the environment. ²²

Overview

The purpose of this study is to add to the knowledge about how to achieve wise use of land to help solve the world-wide problems of food shortages.

The achievements of the farmers in the United States are known around the world. The high levels of production have been attributed to many factors such as climate, soils, economic system, research, educational systems, agricultural service agencies, and others.

The objectives of this study are focused on one part of the work of the Soil Conservation Service in Michigan. Farmers in selected counties were asked about the usefulness of the soil utilization plans which have been prepared for

their farms. The extent of use of the farm plans will be measured and analyzed by several characteristics of the farms and farmers. Additional information about farmer participation in educational meetings will be collected and analyzed.

FOOTNOTES

CHAPTER I

¹Food and Agriculture Organization of the United Nations (1962). Agriculture in the World Economy (Rome, Italy,) p.22

²U.S. Department of Health Education and Welfare. (1978). Vocational Agriculture for Young Farmers: a Planning and Conducting a Program of Instruction in Vocational Agriculture for Young Farmers. (U.S. Government Printing Office.) p.4

³Kearl Bryant and Hadley Reed. (1967). Agricultural Communication Services. (National Project in Agricultural Communications, East Lansing, Michigan, in Cooperation with the Office of Food and Agriculture, International Cooperation Administration, Washington, D.C.)

⁴Claude Qunicy, C.E. Ayers, (1936). Soil Conservation and its Control, (McGraw-Hill Book Co., New York.) p.15

⁵Charles Fisher (1980). Personal Communication, USDA Soil Conservation Service, East Lansing, Michigan.

⁶Soil Conservation Society of America (1976). Resource Conservation Glossary; (7515 Northeast Ankeny Rd, Ankeny, Iowa). p.22-50

⁷ Ibid, p.49.

⁸ Ibid, p.49.

⁹ Ibid, p.50.

¹⁰ Ibid, p.49.

¹¹ Ibid, p.49.

¹² Ibid, p.49.

¹³ Ibid, p.22.

¹⁴Robert Payne (1980). Personal Communication, Agricultural Stabilization and Conservation Service, East Lansing, Michigan 48823.

¹⁵U.S. Department of Commerce, Bureau of the Census, 1974 Census of Agriculture, Michigan State and County Data, (Volume 1, part 22). pp.IX-X.

¹⁶L.S. Robertson (1975). Soil Management - What it is: Department of Crop and Soil Sciences, (Michigan State University. Cooperative Extension Service, 676-1).

¹⁷David Kelsey Lincoln and Chiles Hearne Cannon (1963). Cooperative Extension Work. (Comstock Publishing Associates. A Division of Cornell University Press, Ithaca, New York). p.1.

¹⁸USDA. (1962). Know Your Soil. (Agriculture Information Bulletin, No. 267. Soil Conservation Service. U.S. Government Printing Office, Washington D.C.) p.2-12.

¹⁹John F. Bobbitt, (1980). Personal Communication. Michigan State University.

²⁰D. Richartrd Niehoff, (1977). Non-formal Education and the Rural Poor. (Program of Studies in Non-formal Education, Institute for International Studies. College of Education, Michigan State university). p.212.

²¹Ibid, p.212.

²²Phillip H. Combs with Manzoor Ahmad, (1974). Attacking Rural Poverty, How Non-formal Education Can Help. (Baltimore, The John Hopkins University Press). p.8.

CHAPTER II

REVIEW OF LITERATURE

Soil Survey in the United States

There is not enough information about use of soil survey report by farmers. The subjects of food problem, the importance of agriculture and the wise use of lands have traditionally dominated the literature. Education, and the application of modern knowledge and technology in improving agriculture have produced beneficial results in the past. It is not unlikely that appropriate use of soil survey reports by farmers could prove similiary useful. In this chapter, therefore, the origin, purpose and use of soil survey reports by farmers will be examined and studies of farmer education will be reviewed for their contributions.

Origin and Purpose

The first soil surveys in the United States were undertaken by the U.S. Department of Agriculture in 1899 in Connecticut, New Mexico, and Utah in response to requests for assistance in solving crop production problem.¹ Such surveys provide means to help farmers locate farms in soils

responsive to management, and to help them to decide what crops and management practices are best for the particular soils on their farms.² The underlying purpose of soil surveys is to improve agriculture so as to produce more food and fiber.³

During the late 1920's soil scientists made great advances in mapping soils and understanding of soil properties.⁴ Black and White aerial photos were used first for base maps in mapping soils by the Bushnell, 1920's and the USDA in the 1930's.⁵ Research provided additional knowledge about basic soil properties and uses, Smith and Aandalh (1957) describe soil maps as basic tools for the selection of soil management systems.⁶ Samual et al. (1956) stated that soils were mapped mainly to help farmers to do a better job.⁷ According to the Soil Survey Manual (1951) the rate of agricultural efficiency has been increased since soil surveying began in the United States.⁸

Agricultural interpretations from soil surveys have included the following:

1. Yield predictions or potentials for major crop on soil types at defined levels for management input.
2. Resource input requirements for different crops of agriculture and forestry.
3. Probable behavior of different soils under irrigations.
4. Artificial drainage potential.
5. Estimate of probable response to fertilizers and lime as controlled by the more permanent properties of soils, considering the fertility of lime level as revealed by soil tests.⁹

Use of Soil Survey Report Information

Information from soil survey reports has long been used by farmers and others to make appropriate decisions and plan wisely in various situations.

Farm Uses

Soil survey information may be used by farmers to plan a system of farming that will provide a good living and build the soil for future generations.¹⁰ Riecken (1963) pointed to the importance of soil survey reports in applying technology in farming.¹¹ Subsistence farming patterns can do little to promote social and economic progress; therefore, better systems, such as better soil and water management, must be used to increase crop production.¹² Soil survey reports can be a tool in this process.

Priest, whiteside, and Heneberry (1963) used soil maps, with the soils classified into soil management groups, to evaluate farm lands and their utilizations.¹³ Pennock (1967) indicated that agriculture is still the largest user of soil survey information, except in areas where urbanization has largely replaced agriculture.¹⁴

According to a report from the Southern Regional Soil Survey Work-planning Conference, (1962) the agricultural uses of published soil survey reports are:¹⁵

1. To enable agricultural experiment stations to relate their basic research findings on representative soils, to the soils being used for agricultural purposes.

2. To help vocational agriculture teachers, county agriculture extension agents, and soil conservation workers in development of their plans (e.g. selection of sites, for experimental or demonstration farms).
3. To help engineers in planning irrigation, drainage, and pond construction.

Moka (1978) indicates that "soil maps made after 1940 are helpful for planning most land uses."¹⁶ He also indicates those maps made after 1930 can be useful for general farm planning and/or less detailed planning by updating the mapping unit legend.

Mawby and Haver (1961) discussed different sources of information about farm production used by farmers. They ranked the different sources, by frequency of use, as follows:

1. farm magazines.
2. agricultural agents, vocational agriculture teachers, and agricultural college representatives.
3. experiment and extension service publications.

These researchers suggested that more effective communication of soil survey information might be accomplished by using soil maps and pertinent management information in conjunction with farmer field days at agricultural experiment stations. This would help farmers relate soil maps to actual soil patterns and observe them on their own farms.

Non-Farm Uses

Beyond agricultural use of soil survey report information there are other business, organization and agency

uses of this information in determining the suitability of areas for various purposes. The use and interpretation of soil maps in non-farm activities have been discussed by Buol et al. (1973). They list non-farm uses as follows:¹⁸

1. Planning and Zoning - local, state and regional.
2. Suitability of areas for septic tank filter fields.
3. Highway construction.
4. Building and real estate development site location.
5. Location of underground pipelines.
6. Evaluation of lands for tax assessment.
7. Planning location and layout of outdoor recreation facilities, especially parks.

Pennock (1967) described the usefulness of soil surveys and soil maps for city planners, engineers, realtors, and even insurance companies in community planning and urban development.¹⁹ Bender (1961) discussed the suitability of soils for septic tank fields.²⁰ The application of soil surveys to problems of health, sanitation (as in suitability and design of septic tank filter fields), and engineering has been described by Olson.²¹ Increased use of soil survey information in urban planning was reported by Morris, who found that soils information was useful in determining areas that were not suitable for building due to lack of stable foundation support material.²²

Soil Survey Educational Programs

The following studies indicate the effectiveness of various Formal and Non-formal educational programs, offered by schools and extension agents in the use of soil survey report information.

Sorenson (1957) stresses that an individual's new learning must be based on facts he already knows and, therefore, technological information for farmers should be based on their existing knowledge.²³ He found that formal education had the greatest relationship to soils knowledge and that increased schooling resulted in the best knowledge and understanding of soils. This increased soils knowledge resulted not only from the formal education but also from the impetus it gave to continued learning throughout subsequent years. Better than average knowledge of soils was also found to exist among farmers who often contacted county agents and those who were avid farm magazine readers. Sorenson suggested that new technical soils information available in complex forms be broken down into separate ideas in order to present it in a form compatible with the soil concepts already understood by farmers. He also concluded that most farmers needed better information about plant food requirements and fertilizer needs of different soil types. Extremely poor understanding of the concept of soil PH as a measure of acidity was a problem with most farmers.

Lionberger (1960), in his review of research on the

adoption of agricultural practices, discusses five stages often involved in the adoption of new practices by farmers.²⁴

All of these (awareness, interest, evaluation, trial and adoption) involve the acquisition of information from various sources. Mass media such as newspapers, radio, television, and magazines were reported to be the major sources of information at the awareness stage. At the stage of interest other farmers and various agricultural agencies are important sources of information, in addition to the mass media, enabling the individual to evaluate the practice. During the trial stage, particularly where complex practices are involved, the county agricultural agent, vocational agriculture teacher, and other professional specialists are major sources of information. Finally, in adopting an agricultural practice, a farmer may turn to government agencies or industry to obtain research information. The different kinds and sources of information needed at the five stages indicate that those wishing to communicate soil survey information should be prepared to present it in different forms to meet the needs of farmers in each stage.

Indiana Study

Galloway (1966) described an educational approach to the use of soil surveys in urban development employed in Indiana.²⁵ Rapid urban growth in recent years had spurred interest in use of soils information by persons interested in sound area development. It was learned that urban people,

unlike farmers, had little contact with the soil to develop an appreciation for its characteristics and features. Extension personnel and soil conservation individuals initiated a teaching program to reach such groups as community planners, developers' associations, watershed sponsoring groups, highway departments and other public officials. The program stressed the application of soil survey and soil management information to the problems of concern to these groups. Teaching at the "awareness phase", they used techniques successful with agricultural groups including soil monoliths, colored slides, concise graphic soil descriptions, and block diagrams relating soils to their parent material and topography. Sources of information were selected to permit persons to relate soil features to the soils and landscapes of their own communities. The report points out that Indiana groups were shifting from an awareness to an action phase in which persons were being trained in the use of soil survey information. Two facts became clear: (1) soils maps are complicated, hard to orient to, and difficult to understand, and (2) that reports are highly descriptive, too lengthy and not "user oriented" for most effective use. For better understanding of the soil maps interested individuals were encouraged to solve simulated problems using information obtained from the maps at extension meetings where assistance was available to answer questions or help with problems. Simple demonstrations and slides were used to help people understand

basic soil properties, such as water storage and soil drainage, that are important to urban users of soils information.

Lessons learned from the Indiana program confirm the need for different forms of soil survey information aimed at different users. They also suggest that the standard soil survey report is not an effective source of soils information for inexperienced individuals, unless assistance from persons familiar with it is available.

Kansas Study

Bidwell and Bohannon (1960) in describing the use of soil survey report data in Saline County, Kansas, stress that communication of soil survey information is more than simply handing out a soil survey report.²⁶ To get the most effective use of a newly published soil survey report the following steps were used: (1) awareness was created through the use of the mass media, radio and newspapers; (2) interest was aroused through letters sent out by the county extension agent, feature newspaper articles and editorials, and news articles given over the radio; and (3) education in the form of community meetings. At these meetings a soil scientist described soil properties, a conservationist discussed good land use and treatment, and an agronomist discussed the relation of soils to soil management and soil testing. The meetings included instruction in the use of soil maps and interpretation of soil management information. Follow-up

meetings were suggested to help farmers consider needs and problems in use of the survey, to outline procedures to fit surveys to their particular needs, and the development of long range plans for adopting survey recommendation.

Conclusions drawn from these Kansas experiences tended to parallel those in the Indiana use of soil surveys for urban planning and illustrate the need for various sources of information to meet demands as people become aware, interested and participate in the use of soil survey information. It was also evident that education of potential users is important to maximize the effectiveness of soil survey reports in communicating the information contained in them.

Michigan Study

Parsey (1957) investigated the "Use and Usefulness of a Simplified Soil Survey Report."²⁷ The soil survey report "Get the Most from Your Farmland" (Porter et al., 1955) was prepared for use by farmers in Odessa Township, Ionia County, Michigan.²⁸ The report was distributed to 194 Odessa Township farmers in June 1955 of whom forty-three were interviewed five months later regarding their use of the report. Information obtained from the interviews, was used to answer the questions: (1) Will farmers use the report? (2) Can farmers use the report? and (3) What values do farmers see in the report? It was learned that 67 percent of the farmers "looked" at the report but that only 14 percent

of them "studied" the report, 6 of these at an extension meeting when the report had been discussed. The study concluded that a maximum of 58 percent of the farmers might be expected to look at or use the report if it was simply given to them.

In answer to whether farmers could use the report, a dual situation existed. What farmers said about using the report, and what they were actually able to do in using the report differed markedly. Of the 43 farmers interviewed 29 had looked at the report but of these only 17 said that it was easy to follow. Detailed investigation revealed that 10 of these had some difficulty in following the report despite the fact that 15 of the 17 had received some help. On the average, farmers made five errors out of a possible 12 steps in using the report.

It was found that farmers given assistance by a county agent or a person familiar with the report did considerably better than those without assistance. This indicated that even minimum assistance is highly beneficial in using this type of information. Findings regarding the value of the soil survey report show that about one-fifth of the farmers said they had actually used the report; that more than one-third said they planned to use material in the report; that about one-third found the report not difficult to use; and that about one-half had learned something new from the report. About two-thirds of the farmers who had looked at the report agreed with the general recommendations included

in it which suggests that this relatively large proportion of farmers regarded the report as an authoritative document on soil management.

It was found that technical terms contained in the report were difficult for farmers to understand and use, and that chemical terms associated with lime and fertilizer were words "without meaning." Simple crop yield tables were easy for farmers to use while the more complex tables concerning crop rotations were difficult. Lime and fertilizer tables were found to be the most difficult to use. Conditions considered necessary to make this report an effective communication tool were: (1) that farmers must be interested or become interested in soils; (2) the report itself must build on knowledge which farmers currently possess; (3) the report must be studied closely enough to make its contents understandable; and (4) assistance, explanation, and stimulation must be provided, both for understanding the report and for carrying out its recommendation.

Farmer Education

Research has established that certain characteristics of farmers, including educational level, farming status, size of farm, investment in farming, gross income and participation in community affairs are associated with enrollment and participation in programs of adult education. Rodger's (1961) study of young, part-time farmers who were enrolled

and those who were not enrolled in programs of adult education, revealed that those who were enrolled had more formal education, kept more records of their farming operations, had larger investments in farming and received more income from nonfarm employment than the farmers not enrolled.²⁹ Similarly, Well (1965) found that farmers participating in programs of adult education were younger, had more formal education, received a higher gross income, had larger farms, read more agricultural literature, and were more active in community organizations than nonparticipants.³⁰

Flood's (1964) analysis of participants in adult farmer courses, conducted in Arkansas during 1960-62, revealed that there was a positive relationship between enrollment in courses and the educational attainment of farmers; and that full and part-time farmers attended classes more regularly than farm laborers and persons employed in nonfarm agricultural occupations.³¹ According to Flood teachers of vocational agriculture were significantly more effective in maintaining attendance in adult farmer courses than were special instructors. Other factors which have been identified by Davis (1961) as conducive to successful programs of agricultural education for adult farmers are: (1) active participation by farmers in determining the content of the course, (2) methods of teaching which emphasize problem discussion in contrast to lectures, and (3) on-farm instruction as a integral part of the program.³²

According to Pearce (1964) New York farmers no longer followed the traditional agricultural methods.³³ The establishment of young farmers education in New York was the result of need for programs of instruction in agriculture for beginning farm operators to achieve establishment in farming.³⁴

In 1969 the Texas Agricultural Extension Service developed a pilot program entitled the Intensified Farm planning program (IFPP) which utilized local farmers as program aides in a Cooperative Extension effort to educate farm operators educational assistance was provided on an intensive basis to help change small operators, attitudes about improving and increasing agricultural production and management practices.

They researchers concluded that

More than 98.0 percent of the participants felt the IFPP was important and was meeting a majority of their needs. 99.1 percent of participants said that the program had helped to increase their knowledge of modern production and management practices. 97.7 percent said the training they received would help them feel more secure in thier overall farming situation. 72.0 percent of the participants indicated the IFPP program was "very satisfied." 25.9 percent indicated the program was "satisfied" and, in general, 96.4 percent felt the program should be continued and expanded to other counties. 35

Overall the literature indicates that educations has an important role in the implementation of new practices in farming and that it is particularly necessary in understanding complex soil survey data.

Summary

The first soil surveys in the United States were started by the U.S. Department of Agriculture in 1899. The primary purpose of the soil surveys was to improve agriculture and help farmers to solve their farming problems. Soil survey information is also useful in non-farm activities, to private businesses and government agencies.

Suggestions were made about using soil survey report information in conjunction with farmer field days at agriculture experiment stations, to help farmers observe actual soil patterns and their relations with soil maps.

It was found that formal education level was the greatest determinant in understanding soil information, but that farmers who had contact with the Cooperative Extension Service and read farm magazines also had a better knowledge of soil and its uses than others. Research studies in the adoption of new agricultural practices elicited five stages the acquisition of information from awareness to the adoption of a practice. These stages are AWARENESS through mass media, INTEREST through information from various agencies and other farmers, EVALUATION through agencies and the mass media, TRIAL when complex practices involve the help of professional specialists and, finally, ADOPTION of an agricultural practice when government agencies or industry may be called upon for research information to maximize use of the practice.

It was learned that Extension Service personnel and soil conservation experts have had considerable success in reaching groups of individuals by initiating teaching programs in which they have used soil monoliths, color slides soil description and block diagrams to improve understanding of soil formation and topography. Interested individual were also encouraged to solve their problems through extension meetings by simple demonstrations designed to help farmers and others understand basic soil properties. Studies showed that, in order to get the most effective use of soil survey report information, awareness should be created through use of mass media; interest should be aroused through materials circulated by the county extension agents; and education should be provided in the form of community meetings by soil scientists. Follow-up meetings were also suggested to help farmers make better use of soil survey reports to solve their problems. It was found that farmers given assistance by county extension agents did a better job of understanding and using of soil survey reports than those without assistance, indicating that even a minimum amount of education is highly beneficial in the use of this type of information.

Studies in farmer education have indicated that younger, better educated farmers with larger farms and higher incomes than others tend to enroll and participate in farmer education classes. This indicates that other means need to be employed with smaller farm operators and the results of the 1969 Texas Extension Service's Intensified Farm Planning

Program seem to show that a one-to-one approach, using local farmers as aides, was useful in helping the smaller operators to adopt improved management practices.

FOOTNOTES

CHAPTER II

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CHAPTER III

THE METHOD OF STUDY

This chapter includes information about population, sampling procedure, instrument design, data collection and preparation of the data for analysis.

Population

The target population of interest is comprised of all farm operators in Michigan counties for which a modern soil survey has been completed and soil survey reports have been published (Figure 1). A listing of this population at the county level was obtained from the Agricultural Conservation and Stabilization Service of the United States Department of Agriculture. Special permission had to be obtained from Washington, D.C. by the Michigan office to enable the county ASCS offices to release their lists of farmers (Appendix A).

Sampling Procedure

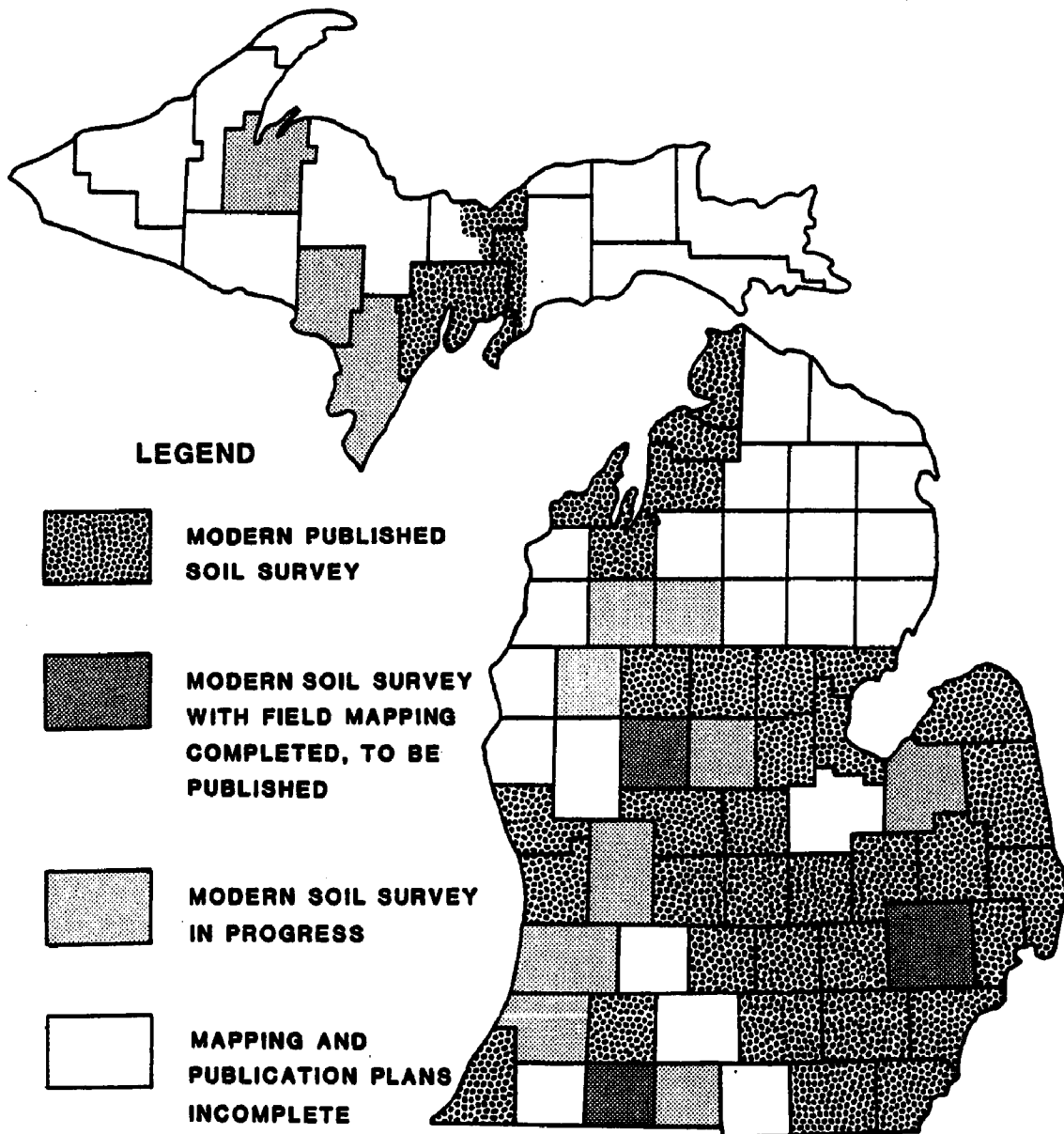
Five counties were chosen based on the geographical and chronological distribution of the soils, kinds of crops, and regional planning of the Cooperative Extension Service (Figure 2). These factors affected selector for several reasons. First, a state-wide representation, which would

include the upper peninsula, was desired Second, kinds of soils vary widely throughout the state, based on different factors extant at the time of their formation. Third, it was assumed that some regional differences exist which might affect the kind of educational programs recommended for best use of soil survey reports. Thus the five counties of Delta, Grand Traverse, Ottawa, Ingham and Sanilac were chosen.

Once the counties were selected, permission was requested to use the counties' ASCS list of farmers and a sample size of 500 (4% of total population) was determined to be optimal for the study based on financial resources available, the types of statistical tests to be used (mainly chi squares), and an estimated return rate of fifty percent. The number of famers randomly chosen per county by the ASCS office was a proportion of the total number of farmers each county contributed to the study population total (table 1). Thus each farmer had an equal probability of selection.¹

Table 1. Number and percent of farmers in each county chosen for study sample:

Counties	Number of Farmers	Number in Sample	Percent
Sanilac County	4283	175	35.12
Ottawa County	4280	175	35.12
Ingham County	2159	88	17.70
Grand Traverse County	819	36	6.70
Delta County	654	26	5.36
Total	12195	500	100.00



Source: Soil Conservation Service

Figure 1: Status of Modern Soil Surveys in Michigan Counties.

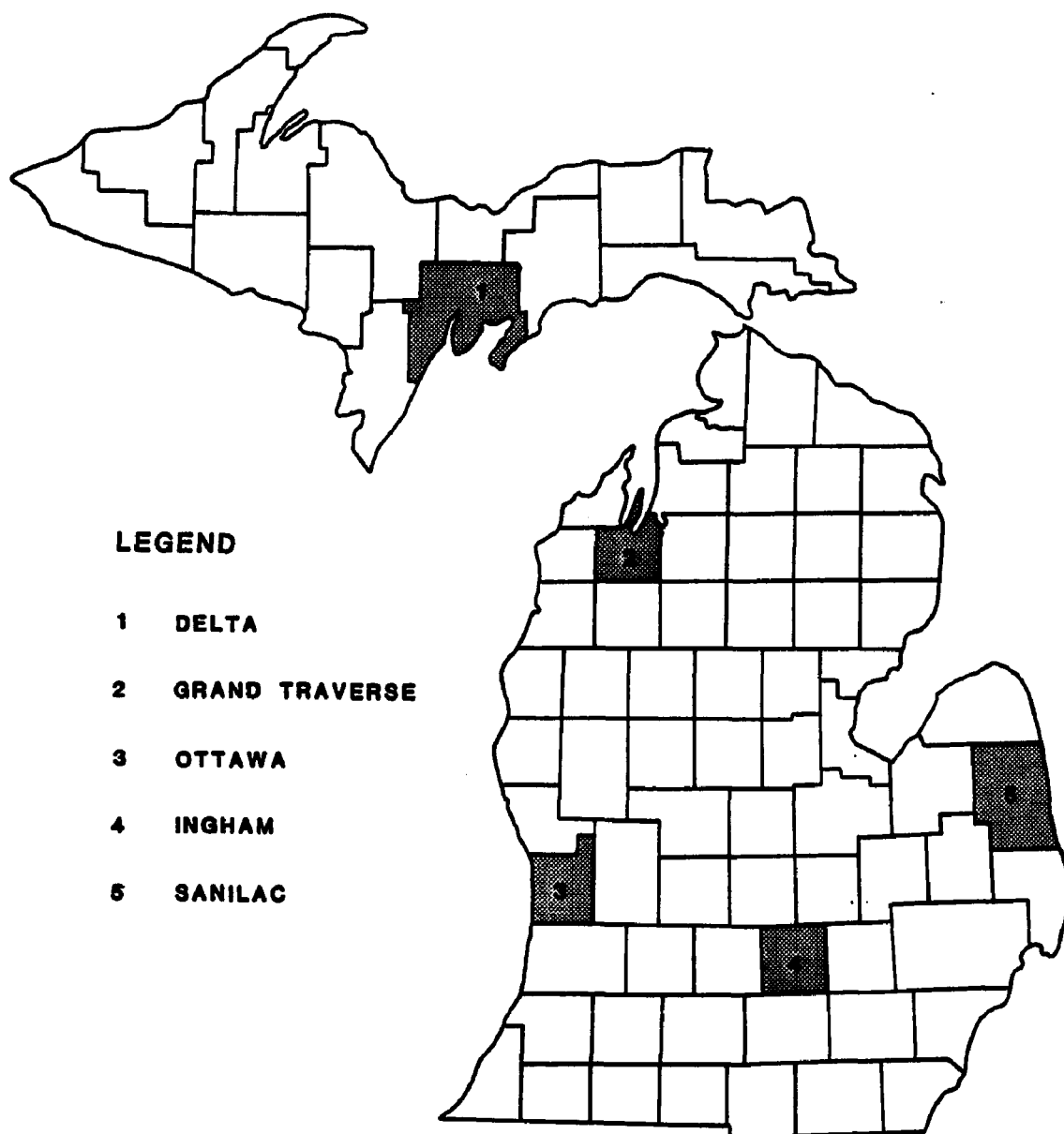


Figure 2: Location of Selected Counties in the Study Area.

Collection of Data

Development of the Instruments

To reach the objectives of this study, it was decided to develop a questionnaire to be administered to the sample population of farmers through a mail survey technique.

Questionnaire for Farmers

The questionnaire for the mail survey was designed so that the questions were directly related to the objectives of this study. The objectives stated in the first chapter led to the development of the following null hypotheses which can be tested by various statistical measures. Statistical procedures chosen were frequency and chi-square techniques.

1. Ho: There is no relationship between Michigan farmer/farm characteristics and knowledge of published modern soil survey reports.
2. Ho: There is no relationship between the use of soil survey report information and selected characteristics of Michigan farmers.
3. Ho: There is no relationship between the use of soil survey report information and selected characteristics of Michigan farms.
4. Ho: There is no relationship between the use of soil survey report information and farmers perceptions about improving agriculture in Michigan.
5. Ho: There is no relationship between Michigan farmer/farm characteristics and interest in attending soil survey report educational programs.

The questionnaire was divided into four parts by type of

questions (Appendix B).

Part A consisted of control questions for categorizing characteristics of farms and farmers, their soil problems and their sources of help.

Part B was designed to find out farmers' awareness about published soil survey reports through farm advisors, their use of and perception of the reports' usefulness.

Part C concerned problems which farm operators may encounter, and farmers' interest in educational programs.

Part D was designed to examine use of the Soil Conservation Farm Plan and its usefulness.

The questionnaire was developed by the researcher in the following steps:

1. Appropriate research literature was reviewed and analyzed, 20 farmers and practitioners in the field of soil surveying were interviewed.
2. The questionnaire and its component items was submitted to a jury of experts in the Department of Soil Sciences, Soil Conservation Service, and Cooperative extension Service. Members of the jury were asked to judge the usefulness of the questionnaire and evaluate its validity and suitability to the population in the study area. Upon the recommendations of the Jury of experts the questionnaire was reviewed by chairman of the guidance committee before being finalized.

Questionnaire for Professional Workers

A list of questions was developed and mailed to Directors of the Cooperative Extension Service and Soil Conservation Service in each selected county regarding the use of soil survey information by farmers. For more detailed information, telephone interviews were arranged and each of

the county directors was interviewed in gathering final data (Appendix C).

Mailing Procedures

A questionnaire and cover letter of explanation was mailed to each farmer selected. To generate more attention and response to the questionnaire, the Cooperative Extension Service Director in each county was asked to sign the cover letters (the C.E.S. director is an important and influential person among farmers). Self-addressed and stamped return envelopes were enclosed. After period of three weeks, thank you cards were sent to all selected farmers. The following follow-up letter (Appendix B) with a new questionnaire and self-addressed, stamped return envelope was mailed to non-respondents, requesting them to return the completed questionnaire as soon as possible. Two weeks later a second thank you card was mailed with a second reminder to return the completed questionnaire.

Responses

As mentioned earlier, 500 questionnaires were mailed; 310 or 62 percent were returned. Ninety-two (29.7%) of these were from people who no longer operated a farm. Twenty-four were retired, 17 had rented out their farms, 16 had sold their farms, 15 were residential, 8 were inactive, 8 had died, and 4 were widowed. Since this 29.7 percent were not

currently farm operators, not a part of the target population, their numbers were subtracted from the original sample of 500 leaving 408. Of the remaining responses, 17 were not usable (5.5%) but 201 replies from active farmers were usable, a response rate of 64.8 percent.

Preparation of Data for Analysis

Confidentiality

In order to obey university rules of confidentiality with regard to research on human subjects, respondents to the questionnaire could not be identified in any way. To separate respondents from non-respondents the return envelopes were coded for each individual farmer. As the questionnaires arrived they were separated from the return envelopes so that they were no longer associated with a code number. Respondents' numbers were then checked off the mailing list, so that follow-up letters were not sent to them.

Methods of Analysis

Dependent and independent variables were identified in order to test the hypotheses. Mainly the chi-square statistical technique was used to analyze the extent of the differences between farm/farmer characteristics, use of soil survey report information, and other related questions. The 0.05 confidence interval was used to determine significance. The differences were identified by comparing calculated and tabulated chi-square (χ^2) values.

A statistical method called Statistical package for Social Science (SPSS) was used for analyzing the data according to the variables in the study (see Appendix D).

Sixty-eight variables were identified and registered on Computer data coding forms. All data from the coding forms were then punched onto FORTRAN cards and placed into the CYBER 750 to obtain research results.

FOOTNOTES

CHAPTER III

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CHAPTER IV

ANALYSIS OF DATA FROM FARMERS

The data presented in this chapter are derived from the 201 usable responses out of a total 310 responses to a mailed questionnaire. The questionnaire was sent to a sample of 500 farmers in five Michigan counties, so respondents 62 percent of the total sample. Thirty-eight percent did not respond. In other words, information was received from approximately three out of every five persons to whom questionnaires were mailed.

General Characteristics of Farmer Respondents

For purposes of grouping and analyzing responses several control questions were designed and included in the questionnaire. Of the 310 respondents, 201 or 64.8 percent were actively engaged in farming. Another 109 or 35.2 percent were retired, deceased, no longer in farming or responses were unusable. Only active farmers were included in this analysis.

Occupations

Of the subset of 201 active farmers, 103 (51.2%) farmed full-time. Hepp (1978) indicates, "full-time farmers spend more than half of their work hours in farming."¹ The remaining 98 (48.8%) are part-time farmers and listed 41 other occupational categories with factory work being the most common (N=17).

Table 2 shows the occupational categories and the numbers of part-time farmers employed in each category.

Table 2. Major Occupations of part-time Farmers.

Occupational Groups/Job Titles	Number
1. Professiona/Technical	22
Teacher	(6)
Nurse	(3)
Lawyer	(2)
Civil Engineer	(2)
Dentist'	(2)
Veterinarian	(2)
Auditor/Accountant	(2)
Twp assessor	(1)
Inventor	(1)
Planner	(1)
2. Manager, Officials and proprietors	11
Inspector	(2)
Builder	(2)
Transportation Supervisor	(2)
Superintendent	(2)
Facility manager	(1)
Auto dealer	(1)
County Commissioner	(1)
3. Clerical and Kindred Workers	3
Clerk	(1)
Mailman	(1)
Gift Store preparation	(1)

Table 2. (cont'd)

Occupational Groups/Job Titles	Number
4. Sales Workers	8
Salesman	(4)
Real Estate/Agent	(3)
Insurance Agent	(1)
5. Craftsmen, Foremen, and Kindred Workers	19
Mechanics, Steam fitter	(7)
Electrician, Hydro Cement Journeyman	(3)
Carpenter, Kelvinator	(3)
Painter, Plasterer	(2)
Maintenance	(2)
General Foreman	(1)
Lithographer	(1)
6. Operative and kindred Workers	35
Factory	(17)
Bus./School Bus driver	(6)
Truck Driver	(4)
Company	(2)
Sawyer	(2)
Welder	(2)
Tireman	(1)
Stockyard	(1)
Total	98

AGE

Table 3 shows the breakdown of the respondents by age groups. Only 31 farmers or 20% of the sample were under 35 years of age. The largest age category was 45-54 years, accounting for 24.4% (N=49) of the sample. Almost half of the sample (N=96) were found to be within the 45-64 age

groups of farmers for each selected county are shown in Appendix E.

Table 3. Number and Percent of Farmers by Age.

Age Groupings	Farmers	
	Number	Percent
25 and under	9	4.5
26-34	22	10.9
35-44	47	23.4
45-54	49	24.4
55-64	47	23.4
65 and over	26	12.9
No Response	1	.5
TOTAL	201	100.0

Level of Formal Education

The highest level of formal education attained by most of the respondents was the high school diploma. More than one-half (52.7%) of the farmer respondents were in this group. An additional 30 (15% had received a Bachelor's or Post-Bachelor's degree. Twenty-one (10.4%) had attended 1-2 years of college, while 44 (21.9%) had failed to complete high school. See Table 4 for frequency and percentage of the respondents at each of the educational levels.

Table 4. Number and Percent of Farmers by Highest Level of Formal Education Attained.

Highest Level of Education Attained	Farmers	
	Number	Percent
Less than High School Diploma	44	21.9
High School Diploma	106	52.7
1-2 Years of College	21	10.4
Bachelor's Diploma	18	9.0
Graduate Degree	12	6.0
TOTAL	201	100.0

Years in Farming

The average respondent had farmed for 24.7 years, with a wide range from less than 1 year to 60 years of farming experience. Most of the respondents, 104 or 53.8 percent, reported they had farmed for 21 years or longer. When the respondents were divided into categories by number of years in farming, the 31+ group represented 35.2 percent or 68 of respondents. The distribution is heavily skewed toward the greater number of years of experience (31+), with the balance of farmers fairly evenly distributed throughout the other categories.

Table 5 shows a frequency breakdown by years of farming.

Table 5. Number and Percent of Farmers by Years Engaged in Farming.

Years of Farming	Farmers	
	Number	Percent
0- 5	26	13.5
6-10	25	13.0
11-20	38	19.7
21-30	36	18.6
31+	68	35.2
TOTAL	193	100.0

Size of Farm

Most of the farmers who responded to the questionnaire farmed from 50 to 180 acres (N=87). These farmers accounted for 43.3% of the responses as shown in Table 6.

When the size of farms reported by the respondents were compared with statewide data on size of Michigan farms from the 1978 Agricultural Census (Table 6), similarities and differences were noted. First, the proportion of the respondents on farms ranging from 50 to 499 acres was quite similar to the Census data (68.7 percent compared to 67.41 percent). However, only 15.9 percent of the farmers in this study were on farms of less than 50 acres (compared to 29.6 percent in the Census); and 15.4 percent were on farms of 500

or more acres (compared to 6.4 percent in the Census). In other words, the proportion of farmers in this study on small farms was less than for the state as a whole; the proportion on large farms was greater than for the state as a whole. Average acreage in the five county study area is 299.179; the smallest farm reported was 7 acres and the largest was 4130 acres. Sizes of farms for each selected county are listed in (Appendix F).

Table 6. Survey Data Compared with Census Data * for Number and Percent of Farmers by Size of Farm.

Size of Farm (Acres)	Farmers			
	Number		Percent	
	Sample	Census*	Sample	Census
1- 49	32	1369	15.9	25.15
50- 179	87	2208	43.3	40.57
180- 499	51	1461	25.4	26.84
500- 999	21	311	10.4	5.71
1000-1999	4	78	2.0	1.43
2000 +	6	16	3.0	.30
TOTAL	201	5443	100.0	100.0

* Source: 1978 Census of Agriculture. Data were taken from tables of data for the five counties included in the study.

Table 7. Size of Farms in Michigan.*

Size of Farms	Farms	
	Number	Percent
Less than 10 acres	3583	5.20
10 to 49 acres	16563	24.30
50 to 179 acres	28145	41.28
180 to 499 acres	15493	22.72
500 to 999 acres	3512	5.15
1000 to 1999 acres	747	1.09
2000 acres and more	115	.26
TOTAL	68158	100.0

* Source: 1978 Census of Agriculture, Preliminary Report, Michigan.

Type of Farm

In this study the types of farms were specified based on agricultural products found in the selected counties. These were cash crops, swine, beef, dairy, poultry, general livestock, fruit and other. Respondents were asked to specify "other" types and those who did listed vegetables, woodlot, and pine trees.

Use of Soil Survey Report Information

Of the 201 respondents 147 (73.1%) had not used, while 50 (24.9%) had used, soil survey report information. Four farmers (2%) did not respond to this item on the questionnaire. All farmers that have used the report were satisfied in using it, only 4 (8%) said it was difficult to understand. Users solved their problems through Soil Conservation Service district personnel.

Table 8 shows the frequency of use of the report by farmers.

Table 8. Number and Percent of Farmers Reporting Use of Soil Survey Report Information.

Use of Soil Survey Report Information	Number of Respondents	Relative Frequency %	Adjusted Frequency %
No	147	73.1	74.6
Yes	50	24.9	25.4
No response	4	2.0	Missing
TOTAL	201	100.0	100.0

Statistical Tests of the Hypotheses

Five hypotheses were tested in terms of several variables. In each instance statistical testing was accomplished through use of a chi-square analysis.

The First Hypothesis

The first hypothesis states that there is a relationship between Michigan farmer/farm characteristics and knowledge of published modern soil survey reports.

Using this hypothesis the relationship between knowledge of modern soil survey reports and selected farm and farmer characteristics was examined. Only two of the crosstabulations evidenced a significant relationship between variables (size of farm and level of formal education).

Slightly more than one-half, or 54.0 percent (108 out of 201), of the respondents were unaware of the soil survey reports, as shown in Table 9. Those who were aware of the reports, indicated their source of information about the reports was the Soil Conservation Service (39.5%), the Cooperative Extension Service (29.85%) and other farmers (17.5%).

Table 9. Knowledge of the Farmers about Published Soil Survey Reports.

Knowledge About Published Report	Number of Farmers	Relative Frequency %	Adjusted Frequency %
No	108	53.7	54.0
Yes	92	45.8	46.0
No Response	1	.5	Missing
TOTAL	201	100.0	100.0

Vocational Agriculture Schools and Consultant were used least as a source of information about soil survey reports. None of the farmers indicated that they used bankers as a source of information. These data are shown in Table 10.

Some of the farmers who indicated that they were unaware of soil survey reports, wrote notes to say they had first learned about the reports through the questionnaire for this research project.

Table 10. Sources of Farmers' Knowledge about Published Soil Survey Reports.

Source of Information	Farmers	
	Number *	Percent
Soil Conservation Service	45	39.50
Cooperative Extension Service	34	29.85
Other Farmers	20	17.50
News Media	7	6.15
Commercial Salesperson	5	4.30
Vocational Agriculture School	1	.90
Consultant	1	.90
Other	1	.90
TOTAL	114*	100.00

*The number of farmers aware of soil survey report exceeds 92, the actual number of knowledgeable farmers because some farmers indicated more than one source of information.

Size of Farm

There was a tendency for those with larger farms to be more aware of soil survey reports. The chi-square for the crosstabulation of size of farm and awareness of the reports was significant at the .04 level with a Cramer's V of .239 indicating a fairly strong relationship (see Table 11).

Table 11. Farmers, Aware Published Soil Survey Reports by Size of Farm.

Awareness of Soil Survey Report	Size of Farm (in acres)						Total
	1-49	50-179	180-499	500-999	1000-1999	2000+	
No	20 10.0	47 23.5	31 15.5	9 4.5	0 0	1 .5	108 54.0
Yes	11 5.5	40 20.0	20 10.0	12 6.0	4 2.0	5 2.5	92 46.0
Column Total	31 15.5	87 43.5	51 25.5	21 10.5	4 2.0	6 3.0	200 100.0

$\chi^2 = 11.437$ d.f. = 5 significance = .04

Cramer's V = .239

Number of missing observations = 1

Level of Formal Education

There was also a relationship between level of formal education and awareness of soil survey reports indicating a tendency among farmers with higher levels of education to be aware of the reports. The chi-square proved significant at the .02 level with a Cramer's V of .23, indicating a fairly strong relationship. See Table 12 for details.

Table 12. Farmers' Levels of Formal Education and Knowledge about Published Soil Survey Reports.

Knowledge About Published Report	Level of Formal Education					Total
	Less than High School	High School	1-2 Years of College	Bachelors Degree	Graduate Degree	
No	25 12.5%	64 32.0%	11 5.5%	4 2.0%	4 2.0%	108 54.0
Yes	19 9.5%	42 21.0%	9 4.5%	14 7.0%	8 4.0%	92 46.0
Column Total	44 22.0%	106 53.0%	20 10.0%	18 9.0%	12 6.0	200 100.0

$\chi^2 = 11.265$ d.f. = 4 significance = .02

Cramer's V = .23

Number of missing observations = 1

The Second Hypothesis

The second hypothesis stated that there is a relationship between the use of soil survey report information and selected characteristics of Michigan farmers.

The selected farmer characteristics examined were years in farming, age, level of formal education and occupation.

Years in Farming

The chi-square score of analysis proved non-significant, suggesting that years of experience in farming have no bearing on the use or non-use of soil survey reports. Table 13 shows number and percent farmers using soil survey report by years in farming.

Age

A similar non-significant relationship was found between age and use of the soil survey reports. A crosstabulation of the two variables resulted in a significance level of .8056, well above the .05 alpha level needed for a statistically significant relationship. Table 14 contains the crosstabulation and tests of significance for these two variables.

Table 13. Number and Percent of Farmers Using Soil Survey Reports by Years in Farming.

Years in Farming	Use of Soil Survey Report					
	No		Yes		Total	
	Number	Percent*	Number	Percent*	Number	Percent*
0	1	.5	--	--	1	.5
1- 5	18	9.5	5	2.6	23	12.6
6-10	26	13.7	14	7.4	40	21.1
11-20	35	18.4	7	3.7	42	22.1
21-30	42	22.1	16	8.4	58	30.5
30+	20	10.5	6	3.2	26	13.7
Column Total	142	77.7	48	25.3	190	100.0

*Percent has been calculated as a part of the total, i.e. 190 respondents.

$\chi^2 = 4.373$ d.f. = 5 significance = .49

Cramer's = .15171

Number of missing observations = 11

Table 14. Number and percent of Farmers Using Soil Survey Report by Age.

Age	Use of Soil Survey Report					
	No		Yes		Total	
	Number	Percent*	Number	Percent*	Number	percent*
25 and under	5	2.6	4	2.6	9	4.5
26-34	15	7.7	6	3.1	21	10.7
35-44	34	17.3	12	6.1	46	23.5
45-54	37	18.9	12	6.1	49	25.0
55-64	35	17.9	11	5.6	46	23.5
64+	20	10.2	5	2.6	25	12.8
Column Total	146	74.5	50	25.5	196	100.0

*Percent has been calculated as a part of the total, i.e. 196 respondents.

$$\chi^2 = 2.297 \quad \text{d.f.} = 5 \quad \text{significance} = .806$$

$$\text{Cramer's } \phi = .108$$

Number of missing observations = 5

Level of Formal Education

A significant relationship was evident, however, between level of formal education and use of soil survey reports. Table 15 shows the crosstabulation and test of significance for these variables. The chi square analysis proved significant at .015, and thus, the null hypothesis of no difference was rejected. In other words, farmers with more than a high school education were more likely to use soil

survey reports than farmers with a high school education or less. The Cramer's V statistics show a fairly strong relationship, with a value of .25.

While those who used the soil survey report comprised only 25.4 percent of the respondents, the crosstabulation suggests that they tended to be more highly educated than those who did not. We would expect the 74.6 percent to 25.4 percent ratio to hold throughout the crosstabulation if education had no bearing on soil survey report use. However, the user to non-user ratio is lower among those with lower levels of education, and higher among those with higher levels. Only at the college graduate level does the user to non-user ratio resemble the total ratio for the crosstabulation. It is worth noting that college graduates comprised the smallest educational group (N=12), and so even this ostensible similarity between the low percentages for the college graduate group and the total percentages must be regarded with some suspicion, owing to small cell size.

Table 15. Farmers' Level of Formal Education and Use of Soil Survey Reports.

Level of Formal Education	Use of Soil Survey Reports					
	No		Yes		Total	
	Number	Percent*	Number	Percent*	Number	Percent*
Less than high school diploma	35	17.8	9	4.6	44	22.3
High school diploma	83	42.1	20	10.2	103	52.3
1-2 years college	11	5.6	9	4.6	20	10.2
Bachelor's degree	9	4.6	9	1.5	18	9.1
Graduate degree	9	4.6	3	1.5	12	6.1
Column Total	147	74.6	50	25.4	197	100.0

*Percent has been calculated as a part of the total, i.e. 197 respondents.

$\chi^2 = 12.32$ d.f. = 4 significance = .015

Cramer's V = .250

Number of missing observations = 4

Occupation

Responses to questions 4 and 10 concerning farmers' occupations and use of soil survey report information are shown in Table 16. Of 201 respondents 147 (74.6%) had not used the report, while 50 (25.4%) had used the report. Four of the farmers did not respond to this question. Of the 147

(74.6%) who had not used the report, 75 (38.1%) farmed only Part-time and had other occupations 72 (36.5%) were engaged only in farming. Of the 50 (25.4%) who had used soil survey reports, 22 (11.2%) farmed Part-time and had other occupations and 28 (14.2%) were engaged only in farming. The crosstabulation and chi square analyses shown in Table 16 indicate that there is no significant relationship between whether farming is a Full-time occupation and the use of soil survey report information.

Table 16. Full and Part-time Farmers' Use of Soil Survey Reports.

Use of the report	Farmers				Total	
	Full-time		Part-time		Number	percent
	Number	Percent	Number	Percent		
No	72	36.5	75	38.1	147	74.6
Yes	28	14.2	22	11.2	50	25.4
Total	100	50.7	97	49.3	197	100.0

$$\chi^2 = .4816 \quad \text{d.f.} = 1 \quad \text{significance} = .48$$

Number of missing observations = 4

The Third Hypothesis

The third hypothesis stated that there is a relationship between the use of soil survey report information and selected characteristics of Michigan farms.

Selected characteristics which were examined were size of farm (total acreage), and type of farm.

Size of Farm/Acre

A significant relationship was found between the sizes of farms in total acreage and whether or not the operators used soil survey reports, as shown in Table 17 and Figure 3.

Table 17. Acreage of Farms and Farm Operators' Use of Soil Survey Reports.

Size of Farm/Acre	Use of Soil Survey Report by Farm Operator					
	No		Yes		Total	
	Number	Percent	Number	Percent	Number	Percent
1- 49	27	13.7(90%)	3	1.5(10%)	30	15.2
50- 179	72	36.5(83%)	15	7.6(17%)	87	44.2
180- 499	34	17.3(69.4%)	15	7.6(30.6%)	49	24.9
500- 999	11	5.6(52.4%)	10	5.1(47.6%)	21	10.7
1000:1999	1	.5(25%)	3	1.5(75%)	4	2.0
2000+	2	1.0(50%)	4	2.0(50%)	6	3.0
Column Total	147	74.6	50	25.4	197	100.0

$$\chi^2 = 23.582 \quad \text{d.f.} = 5 \quad \text{significance} = .003$$

$$\text{Cramer's } V = .345$$

Number of missing observations = 4

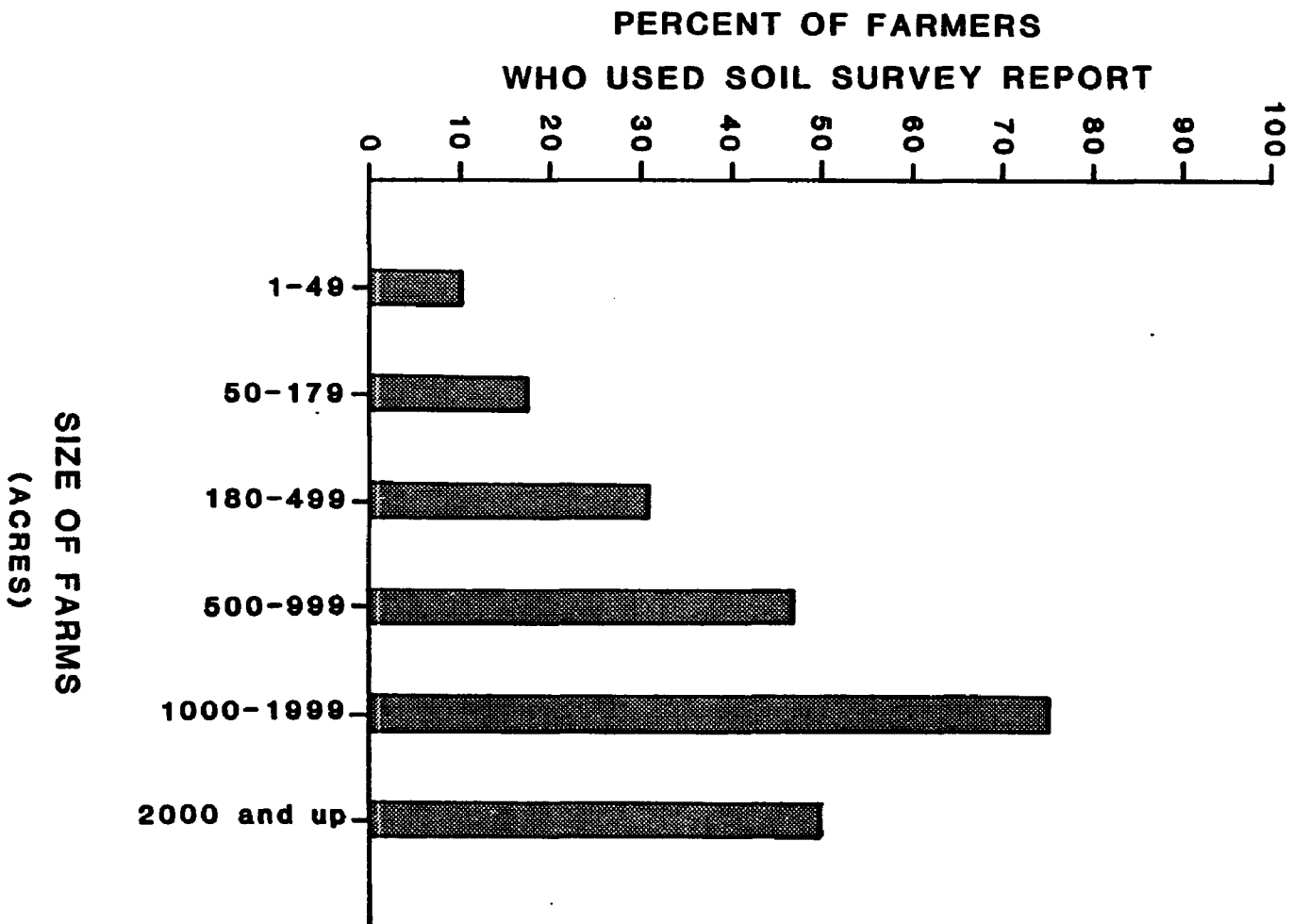


Figure 3: Farm Size and Use of Soil Survey Report.

As the crosstabulation demonstrates, the tendency is for individuals who operate larger farms to use soil survey reports at a proportionately higher rate than those with smaller farms. The extent of the significance (.003) and the strength of the relationship (Cramer's $V = .0345$) urge rejection of the null hypothesis of no relationship.

Type of Farm

Types of farms were broken down into 8 non-exclusive categories: 1) cash crop 2) swine; 3) beef; 4) dairy; 5) poultry; 6) general livestock; 7) fruit; and 8) other. A respondent could have (and was likely to have) checked more than one category to describe his farm. The crosstabulation and chi square analyses evidence no significant relationship between type of farm and use of soil survey reports. See Table 18 with summary of statistical tests for each type of farm.

Table 18. Type of Farm and Use of Soil Survey Reports with Summary of Statistical Tests for Significance.

Type of Farm	Use of Soil Survey Reports						Significance
	No		Yes		No Response		
	Number	Percent	Number	Percent	Number	Percent	
Cash Crop	84	42.6	36	18.3	77	39.1	.09
Swine	10	5.1	6	3.0	181	91.1	.38
Beef	25	12.7	14	7.1	158	80.2	.13
Dairy	32	16.2	10	5.1	155	78.7	.94
Poultry	10	5.1	3	1.5	184	93.4	1.0
General Livestock	12	6.1	2	1.0	183	92.9	.5
Fruit	13	6.6	2	1.0	182	92.4	.41
Other	19	9.6	4	2.0	174	88.3	.49

Note: See Appendix F for specific tables for each type of farming.

The Fourth Hypothesis

The fourth hypothesis stated that there is a relationship between the use of soil survey report information and farmers' perceptions about improving agriculture in Michigan.

This hypothesis was concerned with the soil Conservation Service's Farm Plan Program, which was designed to assist individual farmers in the best use of their soil.

The selected characteristics examined were: years in farming, level of formal education, size of farm, age of operator and type of farm.

In order to examine the respondents' opinions about the effectiveness of the farm plan program, the subset of respondents who were aware of the program were identified first. Table 19 shows that 92 (45.8%) of the farmers were aware of the program's existence. Table 20 further shows that, of those aware of the program 52 (56.50%) actually used the program, while 39 (42.40%) did not use it. Of 52 users 18 (34.6%) stated the program was very useful,* 27 (51.9%) found the program moderately useful and 6 (11.5%) said the program was of little use. Only 1 (1.9%) indicated that the program was not useful (see Table 21).

None of the farm or farmer characteristics proved to have a significant relationship with the degree to which the program was deemed useful to the respondent. See Tables 22 thru 24 for the results of this analysis.

*Synonyms have been substituted for actual terms used in the questionnaire to preserve grammatical construction.

Table 19. Farmers' Awareness of Soil Conservation Service Farm Plan.

Awareness of Farm Plan	Farmers	
	Number	Percent
No	182	50.7
Yes	92	45.8
No Response	7	3.5
TOTAL	201	100.0

Table 20. Farmers' Use of Soil Conservation Service Farm Plan.

Use of Farm Plan	Farmers	
	Number	Percent
No	39	42.40
Yes	52	56.50
No Response	1	1.10
TOTAL	92	100.0

Table 21. Degree of Usefulness of Soil Conservation Service Farm Plan Among Users.

Degree of Usefulness	Users	
	Number	Percent
Very Useful	18	34.6
Moderately Useful	27	51.9
Of Little Use	6	11.5
Not Useful	1	1.9
TOTAL	52	100.0

While there was no relationship between farm/farmer characteristics and use of the Soil Conservation Service farm plan program. But by analyzing each table the effectiveness of program is obvious.

Table 22 shows that farmers with different years of farming experiences, have used the plan. Of 51 users 17 (33.3%) said the program was great useful. Twenty-seven (52.9%).

Table 22. Number and Percent of Farmers by Years of Farming and Usefulness of the Farm Plan.

Usefulness of the Farm Plan	Years of Farming					Total
	0-5	6-10	11-20	21-30	31+	
Great	2 3.9%	4 7.8%	1 2.0%	9 17.6%	1 2.0%	17 33.3
Medium	2 3.9%	7 13.7%	5 9.8%	9 17.6%	4 7.8%	27 52.9
Little	1 2.0%	2 3.9%	1 2.0%	2 3.9%	0 0	6 11.8
None	1 2.0%	0 0	0 0	0 0	0 0	1 2.0
Column Total	6 11.8%	13 25.5%	7 13.7%	20 39.2%	5 9.8%	51 100.0

$$\chi^2 = 12.136 \quad \text{d.f.} = 12 \quad \text{significance} = .434$$

No Response = 1

indicated the program was medium and 6 (11.8%) said the program was little helpful and 1 (2%) said the program was not useful.

Table 23 shows usefulness of the plan and education level of the farmers. Of 51 users 18 (34.6%) said the plan was great, 27 (51.9%) said the plan was medium and 6 (11.5%) said plan was little useful. Only 1 (1.9%) indicated the plan was not useful.

Table 23. Number and Percent of Farmers by Level of Formal Education and Usefulness of the Farm Plan.

Usefulness of the Farm Plan	Level of Formal Education					Total
	Less than High School	High School	1-2 Year of College	Bachelors	Graduate	
Great	3 5.8%	9 17.3%	3 5.8%	1 1.9%	2 3.8%	18 34.6
Medium	4 7.7%	11 21.2%	6 11.5%	5 9.6%	1 1.9%	27 51.9
Little	0 0	3 5.8%	0 0	1 1.9%	2 3.8%	6 11.6
None	0 0	0 0	0 0	1 1.9%	0 0	1 1.9
Column Total	7 13.5%	23 44.2%	9 17.3%	8 15.4%	5 9.6%	52 100.0

$$\chi^2 = 13.99 \quad \text{d.f.} = 12 \quad \text{significance} = .3008$$

Table 24 shows usefulness of the plan by different age groups. Of 51 users 17 (33.3%) said plan was great, 17 (52.9%) said plan had medium effect, 6 (11.8%) said plan had little effect in their farming. One (2%) said plan was not useful at all.

Table 24. Number and Percent of Farmers by Group of Age and Usefulness of the Farm Plan.

Usefulness of the Farm Plan	Age					Total
	26-34	35-44	45-54	55-64	65+	
Great	1 2.0%	4 7.8%	5 9.8%	5 9.8%	2 3.9%	17 33.3
Medium	1 2.0%	7 13.7%	7 13.7%	9 17.6%	3 5.9%	27 52.9
Little	0 0	3 5.9%	1 2.0%	2 3.9%	0 0	6 11.8
None	1 2.0%	0 0	0 0	0 0	0 0	1 2.0
Column Total	3 5.9%	14 27.5%	13 25.5%	16 31.4%	5 9.8%	51 100.0

$$\chi^2 = 18.851 \quad \text{d.f.} = 12 \quad \text{significance} = .09$$

$$\text{Cramer's } V = .35101$$

No Response = 1

Table 25 shows that the different levels of usefulness of the plan by different farm size categories was not statistically significant. This is shown in Table 26 and illustrated in Figure 4. More farmers with 50-179 acres of land used the Farm Plan (19), while only two farmers with 1000-1999 acres used the Farm Plan. However, the two farmers with 1000-1999 acres represented 50 percent of all the farmers in the study on that size farm while the 19 farmers

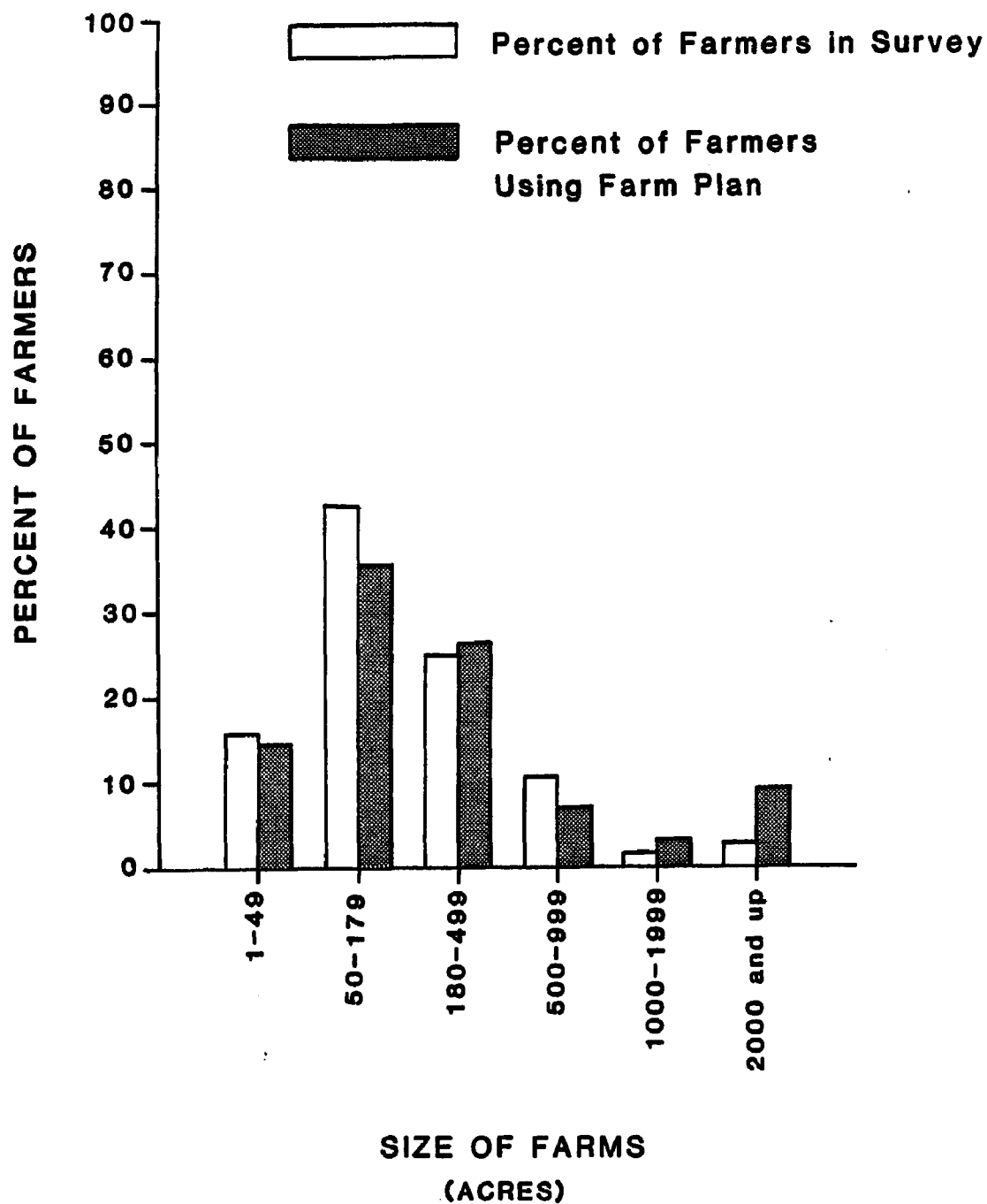


Figure 4: Percent of Farmers in Survey and Percent Who Used Farm Plan.

on 50-179 acres represented only 22 percent of the farmers in the study on that size farm.

Table 25. Number and Percent of Farmers by Size of Farm (acre) and Usefulness of the Farm Plan.

Usefulness of the Farm Plan	Size of Farm (Acres)						Total
	1-49	50-179	180-499	500-999	1000-1999	2000+	
Great	4 7.7%	7 13.5%	5 9.6%	1 1.9%	0 0	1 1.9%	18 34.6
Medium	2 3.8%	7 13.5%	9 17.3%	3 5.8%	2 3.8%	4 7.7%	27 51.9
Little	2 3.8%	4 7.7%	0 0	0 0	0 0	0 0	6 11.5
None	0 0	1 1.9%	0 0	0 0	0 0	0 0	1 1.9
Column Total	8 15.4%	19 36.5%	14 26.9%	4 7.7%	2 3.8%	5 9.6%	52 100.0

$$\chi^2 = 13.476 \quad \text{d.f.} = 15 \quad \text{significance} = .56$$

$$\text{Cramer's } V = .29391$$

Note: See Appendix G for specific tables for type of farm/acre and usefulness of the farm plan.

Table 26. Number and Percent of Farmers in Survey and Used Farm Plan by Size of Farm (acre).

Size of Farm (acres)	Farmers Responses			
	In Survey		Used Farm Plan	
	Number	Percent	Number	Percent
1- 49	32	15.9	8	15.4
50- 179	87	43.3	19	36.5
180- 499	51	25.4	14	26.9
500- 999	21	10.4	4	7.7
1000-1999	4	2.0	2	3.8
2000 or more	6	3.0	5	9.6
TOTAL	201	100.0	52	100.0

The Fifth Hypothesis

The fifth hypothesis stated that there is a relationship between Michigan farmer/farm characteristics and interest in attending soil survey report educational programs.

The respondents' feelings toward soil survey educational programs were measured using four variables: 1) desire to attend such programs; 3) time of year most willing to attend; and 4) preferred length of program. Each of these four variables was crosstabulated with a total of 12 farm/farmer characteristic variables for a total of 48 crosstabulations. For the sake of brevity, the non-significant crosstabulations are not shown.

Desire to Attend Educational Programs

Overall 53.2% (N=107) were interested in attending educational programs about using soil survey report information. Table 27 shows number and percent of farmers who are willing to attend educational programs.

Table 27. Frequency of willingness to attend Educational Programs.

Willingness to Attend	Number of Respondents	Relative Frequency %
No	94	46.8
Yes	107	53.2
TOTAL	201	100.0

Farmers were asked if they had attended any educational programs which presented information about the use of soil survey reports. A majority of the farmers 175 or (87.1%) had not attended, while only twenty-one (10.4%) reported they had attended one or more educational programs about the use of soil survey report information. Five (2.5%) did not respond to this question.

Six of the 21 respondents (28.6%) said the educational program was "very useful", while nine (42.8%) said the programs was "useful" and five (23.8%) said the program was "faair". Only one (0.5%) found the program "not useful". Tables 28 and 29 show the results of these analyses.

Table 28. Number and Percent of Farmers who have Attended Education Programs Concerning Use of Soil Survey Reports.

Attend in Educational Program	Number of Farmers	Relative Frequency %	Adjusted Frequency %
No	175	87.1	89.3
Yes	21	10.4	10.7
No Response	5	2.5	Missing
TOTAL	201	100.0	100.0

Table 29. Farmer Reports on Usefulness of Soil Survey Educational Programs.

Usefulness of Program	Farmers		
	Number	Relative Frequency %	Adjusted Frequency %
Very Useful	6	3.0	28.6
Useful	9	4.5	42.9
Fair	5	2.5	23.8
Not Useful	1	.5	4.8
No Response	180	89.6	Missing
TOTAL	201	100.0	100.0

Distance Farmers are Willing to Travel to Attend Educational Programs

Of the subset of interested farmers, 46 (43.0%) preferred to attend such educational programs within 20 miles of their farms, with another 43 (40.2%) willing to go 20-40 miles. Only 18 (16.8%) were willing to go any further (Table 30).

Table 30. Distance Farmers will Travel to Attend Educational Programs.

Miles Distance	Number of Respondents	Relative Frequency %	Adjusted Frequency %
Less than 20 miles	46	22.9	43.0
20-40 miles	43	21.3	40.2
40-60 miles	7	3.5	6.5
60-80 miles	1	.5	1.0
It does not matter	10	5.0	9.3
No Response	94	46.8	Missing
TOTAL	201	100.0	100.0

Seasonal Preferences for Educational Programs

Most farmers preferred the winter for the educational sessions 81 (75.7%) with another 17 (15.9%) favoring the spring. Only 9 (8.4%) were interested in any other season (Table 31).

Table 31. Seasonal Preferences of Farmers Interested in Attending Educational Meetings During Various Times of the Year.

Time of Year	Number of Respondents	Relative Frequency %	Adjusted Frequency %
Winter	81	40.3	75.7
Spring	71	8.5	15.9
Summer	4	2.0	3.7
Fall	5	2.5	4.7
No Response	94	46.8	Missing
TOTAL	201	100.0	100.0

Preferred Length of Educational Program

Most farmers preferred 1/2 day 52 (48.6%) or 1 day sessions 47 (43.9%) with only 8 (7.5%) favoring longer sessions (Table 32).

Table 32. Length of Educational Programs Preferred by Farmers.

Length of Program	Number of Respondents	Relative Frequency %	Adjusted Frequency %
1/2 day	52	25.91	48.6
1 day	47	23.4	43.9
2 day	1	.5	.9
Others	7	3.5	6.6
No Response	94	46.7	Missing
TOTAL	201	100.0	100.0

A few significant relationship arose in the crosstabulation of the aforementioned variables and farm/farmer characteristics. In some cases, significant differences had to be ignored due to small cell sizes.

A significant relationship was found between desire to attend educational programs and the following variables.

Size of Farm

As might be expected, there was a positive relationship between size of farm and the respondent's desire to attend educational programs; the chi square results were significant

beyond the .0001 level with the Cramer's V score of .389 indicating a strong relationship. See Table 33 for details.

Table 33. Farmers' Willingness to Attend Educational Programs by Size of Farm.

Willingness to Attend	Size of Farm						Total
	1-49	50-179	180-499	500-999	1000-1999	1999+	
No	24 11.9%	49 24.4%	16 8.0%	4 2.0%	0 0	1 .5%	94 46.8%
Yes	8 4.0%	38 18.9%	35 17.4%	17 8.5%	4 2.0%	5 2.5%	107 53.2
Column Total	32 15.9%	87 43.3%	51 25.4%	21 10.4%	4 2.0%	6 3.0%	201 100.0

$$\chi^2 = 30.47 \quad \text{d.f.} = 5 \quad \text{significance} = .0001$$

$$\text{Cramer's } V = .389$$

Age

Next, the younger the farmers, the greater was the tendency to be interested in soil survey educational programs. This relationship was found to be significant with a significance level of less than .0001, and a Cramer's V score of .37%, indicating a strong overall relationship. See Table 34 for details.

Table 34. Number and Percent of Farmers by Age Group and Their Willingness to Attend Educational Programs.

Willingness to Attend	Age						Total
	25 and under	26-34	35-44	45-54	55-64	65 and over	
No	5 2.5%	4 2.0%	14 7.0%	20 10.0%	31 15.5%	19 9.5%	93 46.5
Yes	4 2.0%	18 9.0%	33 16.5%	29 14.5%	16 8.0%	7 3.5%	107 53.5
Column Total	9 4.5	22 11.0	47 23.5	49 24.5	47 23.5	26 13.0	200 100.0

$$\chi^2 = 27.836 \quad \text{d.f.} = 5 \quad \text{significance} = .0001$$

$$\text{Cramer's } V = .373$$

Number of missing observations = 1

Type of Farm

Cash crop farmers showed significantly more interest in the soil survey educational programs than other types of farmers. Whereas 53.2 percent (N=107) of all farmers were interested in the programs, only 59 percent (N=72) of the cash croppers expressed interest. The corrected chi square proved significant at the .041 level. See Table 35 for details.

Table 35. Kinds of Crops and Farmer's Willingness to Attend Educational Programs.

Kind of Crop	Willingness to Attend				Total Number of Respondents		Total Number of Note-Respondents		Level of Significance
	No	Percent	Yes	Percent	Number	Percent	Number	Percent	
Cash Crop	50	24.9	72	35.8	122	60.7	79	39.3	.04
Swine	5	2.5	11	5.5	16	8.0	185	92.0	.19
Beef	15	7.5	26	12.9	41	20.4	160	79.6	.14
Dairy	16	8.0	26	12.9	42	20.9	159	79.1	.20
Poultry	6	3.0	7	3.5	13	6.5	188	93.5	.96
General Livestock	6	3.0	8	4.0	14	7.0	187	93.0	.76
Fruit	5	2.5	10	5.0	15	7.5	186	92.5	.27

Years of Experience and Distance Farmers were Willing to Travel.

A significant relationship was found between the distance that a farmer was willing to travel for educational programs and years of farming experience. The tendency was for those with more experience to be willing to go longer distances to attend the educational programs. The chi square proved significant at the .03 significance levels; a Cramer's V of .25 indicates a fairly strong relationship as shown in Table 36.

Table 36. Farmers' Interest in Attending Educational Programs by Years of Farming and Various Travel Distances.

Distance to Travel	Years in Farming					Total
	0-5	6-10	11-20	21-30	31+	
Less than 20 miles	10 9.4%	7 5.6%	12 11.3%	14 13.2%	2 1.9%	45 42.5
20-40 miles	3 2.8%	16 15.1%	9 8.5%	11 10.4%	4 3.8%	43 40.6
40-60 miles	0 0	2 1.9%	1 0.9%	1 0.9%	3 2.8%	7 6.6
60-80 miles	0 0	0 0	1 0.9%	0 0	0 0	1 0.9
It doesn't matter	1 0.9%	1 0.9%	4 3.8%	4 3.8%	0 0	10 9.4
Column Total	14 13.2%	26 24.5%	27 25.5%	30 28.3%	9 8.5%	106 100.0

$$\chi^2 = 27.404 \quad \text{d.f.} = 16 \quad \text{significance} = .037$$

$$\text{Cramer's } V = .245$$

Number of missing observations = 95

Level of Formal Education and Time of Year

There was also a tendency for the farmers with higher levels of schooling to favor non-winter education sessions to a greater degree than less educated farmers. The chi square proved significant at less than the .0001 level, with a Cramer's V of .37 indicating a strong overall relationship. See Table 37 for details.

Table 37. Seasonal Preferences for Educational programs by Time of Year and Level of Formal Education.

Time of Year	Level of Formal Education					Total
	High School	High School	1-2 years College	Bachelor	Graduate	
Winter	14 13.1%	47 43.9%	10 9.3%	8 7.5%	2 1.9%	81 75.7
Spring	3 2.8%	9 8.4%	1 0.9%	3 2.8%	1 0.9%	17 15.9
Summer	1 0.9%	0 0	0 0	0 0	3 2.8%	4 3.7
Fall	0 0	2 1.9%	1 0.9%	2 1.9%	0 0	5 4.7
Column Total	18 16.8%	58 54.2%	12 11.2%	13 12.1%	6 5.6%	107 100.0

$\chi^2 = 45.41$ d.f. = 12 significance = .0000

Cramer's V = .376

Number of missing observations = 94

Dairy farmers tended to prefer shorter educational sessions than did non-dairy farmers, as indicated in Table 38. The chi square proved significant at the 0.0178 with a Cramer's V of .304, indicating a strong relationship.

Table 38. Dairy Farmers Preferred Length of Educational Program.

Length of Program	Dairy farmer				Total	
	No		Yes		Number Percent	
	Number	Percent	Number	Percent	Number	Percent
1/2 day	32	29.4	20	18.3	52	47.7
1 day	41	37.5	6	5.5	47	43.1
2 day	1	.9	0	0	1	.9
Others	8	7.3	1	.9	9	8.3
TOTAL	82	75.2	27	24.8	109	100.0

$\chi^2 = 10.095$ d.f. = 23 significance = .01

Cramer's V = .304

Number of missing observations = 92

Sources of Contact about Farmers General Soil Problems

Question 7 was designed to determine whether or not the farmer's had contact with other sources of information regarding their general soil problems. Four categories for frequency of such contact were established.

1. Never
2. Seldom
3. Occasionally
4. Often

Among different possible sources of contact "Other Farmers" "Cooperative Extension Service", "Soil Conservation Service" and "Commercial Sales Persons" were most frequently listed and "Vocational Agriculture Instructure", "Consultant", "Banker" and "New Media" were the least cited sources of information for individuals who discussed their soil problems. Table 39 shows amount of contact with different sources of information. Other sources of information, not included on the questionnaire, but listed by the farmers when they responded, included: fertilizer supplier, countryside journals, farm journals, books and magazines.

Table 39. Farmers' Contact with Various Sources of Information about General Soil Problems.

Source of Information	Never		Frequency of Discussion				Often		No Response	
	Number	Percent	Seldom Number	Percent	Occasionally Number	Percent	Number	Percent	Number	Percent
Other Farmers	9	4.5	11	5.5	91	45.3	28	13.9	62	30.9
Cooperative Extension Service	42	20.9	20	10.0	52	25.9	15	7.5	72	35.8
Soil Conservation Service	44	21.9	19	9.5	54	26.9	10	5.0	74	36.8
Commercial Salesperson	43	21.4	16	8.0	33	16.4	21	10.4	88	43.8
New Media	73	36.3	7	3.5	10	5.0	8	4.0	103	51.3
Banker	81	40.3	9	4.5	11	5.5	2	1.0	98	48.8
Vocational Agriculture Ins.	80	39.8	14	7.0	8	4.0	00	0.0	99	49.3
Others	47	23.4	00	0.0	00	0.0	2	1.0	152	75.6
None of the Above	36	17.9	00	0.0	00	0.0	00	0.0	165	82.1

Soil Management Problems

Soil management is a major problem for many Michigan farmers. Of 201 respondents 103 (51.2%) said they have been faced with erosion, compaction and septic tank system problems. Ninety-four (46.8%) did not report any problems. Four (2.0%) did not answer the question.

The Soil Conservation Service was reported to be the most used and bankers were the least used sources from which the farmer's obtained information and help to solve their soil problems. Six (3%) referred to other sources of information in addition to the two named above including soil testing laboratories, farm magazines, and professors at Michigan State University.

In question 12.1 farmers were asked to check as many sources as they got help from. Tables 40 and 41 show the results of that analysis.

Table 40. Number and Percent of Farmers who Reported having Soil Management Problems.

Have Soil Management Problems	Farmers	
	Number	Percent
No	94	46.8
Yes	103	51.2
No Response	4	2.0
TOTAL	201	100.0

Table 41. Sources of Information for Farmers Seeking Help on Soil Management Problems.

Source of Information	Farmers	
	Number	Percent
Soil Conservation Service	53	26.4
Cooperative Extension Service	46	22.8
Other Farmers	41	20.4
Commercial Salesperson	29	14.4
News Media	10	5.0
County Health Department	7	3.5
Others	6	3.0
Vocational Agriculture Instructors	5	2.5
Consultant	3	1.5
Banker	1	.5
TOTAL	201 *	100.0

*Number of farmers who are having soil problems is not equal to 103, the actual number of Table 41 frequency. The reason for this difference is that some marked more than one source of information.

Soil Testing

Of 201 respondents 149 (74.10%) had taken their soil samples for soil testing. Fifty-one (24.40%) had never had soil testing of their particular fields. Table 42 shows frequency breakdown of soil samples testing.

Table 42. Number and Percent of Farmers who Test Their Soils.

Number of Years	Farmers	
	Number	Percent
Every 2- 3 years	74	36.70
Every 4- 6 years	48	23.90
Every 7-10 years	14	7.00
Every 11-15 years	13	6.50
Never	51	25.40
No Response	1	.50
TOTAL	201	100.00

FOOTNOTES

CHAPTER IV

¹Ralph Hepp, and Linda Halsey, (1978). "Programming for small, part-time farmers." (Summary of Proceedings of an Extension In-Service Training Workshop or Educational Program Innovations for Small/Part-time Farm Operators. Staff paper 78-26, Department of Agricultural Economics, Michigan State University, East Lansing).

CHAPTER V

ANALYSIS OF INTERVIEWS WITH COUNTY EXTENSION AND SOIL CONSERVATION DISTRICT DIRECTORS

In order to obtain an understanding of common soil problems and use of soil survey report information in Michigan, the directors of the Cooperative Extension Service and Soil Conservation Districts in each of the selected counties were interviewed by telephone. One week before the telephone interview a list of questions was mailed to each of the directors. This procedure simplified the telephone communication and provided a common base for the interviews. All of the directors were cooperative and only one of the Soil Conservation District Directors was unable to respond. This part of the study assisted the researcher in understanding the roles of the two offices (Cooperative Extension Service and Soil Conservation Service) in helping farmers to use soil survey report information accurately and wisely.

In general, the directors identified erosion, compaction, drainage, fertility and pH as major problems in some counties and sources of concern in all the counties. All the directors believed that farmers in thier districts sought information about soil survey reports.

Farmers and Their Use of Soil Survey Report

When asked whether farmers could use soil survey reports without additional help, six of the directors stated that farmers were able to use soil survey report information without help, while three of them believed that, in general, farmers were not able to use the information without help. Suggested means of providing such help were farmer meetings, farm visits, and individual interpretation of soil management information to help farmers in better understanding the report. All of the directors believed that soil survey report information was very helpful, and that farmers should use such information in order to protect their soils and increase yields per acre.

Educational and Technical Help From County Offices

The directors felt that farmers needed training which could be offered through short classes, meetings, field tours, and slide shows. When asked about educational/technical help available from the county offices, five of the nine directors did not respond to this question. Four indicated they offered such help by conducting group, or individual meetings to tell farmers how to look up soil information, how to use soil information, and how to use various tables in the reports. They also provided refresher courses.

Farmers Seeking Information about Soil Survey Report

Each director was asked whether or not records were kept of the frequency of visits or calls by farmers and whether this included farm/farmer characteristics. The answer was no; all stated that they help anyone who comes to them for help or advice. In general, they believed that larger and more educated farmers seek more information and advice from the Cooperative Extension and Soil Conservation District personnel. They also stated that younger farmers were more likely to ask about soil survey report information than older farmers.

The directors each listed a number of other places to which farmers may go for information, if they don't go to Cooperative Extension or Soil Conservation Personnel. Other sources mentioned included neighbors, commercial salespersons, consultants, and farm magazines. One of the directors mentioned that some of those on larger farms go directly to Michigan State University, because they are graduates and know some of the professors.

Further Plan for Use of Soil Survey Report Information

When asked what future changes they would like to see in their programs to help farmers use soil survey information; one felt that his current program was appropriate, and six recommended conducting short courses on soils, mostly by focusing on the soil survey report information. They also suggested providing short news articles on discrete sections

of the soil survey report for use in local newspapers, Extension news letters, and Soil Conservation Service news letters to help explain and promote use of the report. Some directors also recommended that demonstrations be conducted by Cooperative Extension and Soil Conservation Service personnel to show farmers how soil characteristics are identified by soil scientists and how they can use the report to understand their soils, characteristics. Two of the directors did not respond to this question.

Summary

In summary, nine out of ten of the directors of the two agencies in the five counties were interviewed and all identified soil problems extant in their counties. While they all felt soil survey report information could be useful to farmers in their counties, six felt farmers could use the reports without help and three did not. Four indicated that they currently offer such help but five did not respond to this inquiry. Although none of the directors currently keeps records on farmers' calls or visits, they all indicate they help anyone who comes to them for help or advice and felt that the younger, more educated farmers with larger spreads tended to seek information or assistance more frequently than older, less educated farmers without large spreads. This information tended to confirm results of the farmer survey. Six of the informants suggested programs to aid farmers in using soil survey reports.

CHAPTER VI

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

This chapter will contain a very brief description of the present study, its conclusions and recommendations for future studies about effective use of soil survey report information in Michigan.

Summary

The rapid increase in the world population has created increased demand for food and fiber since food production has been increasing at a slower rate than population. Farmers need to have access to accurate and reliable information about their soils and good soil management. More than half of the Michigan counties have been surveyed and the results have been published as soil survey reports through the Soil Conservation Service.

The primary purpose of this study was to gain a better understanding of Michigan farmers awareness and use of soil survey report information. Selected characteristics of farms and farmers were used to try to determine information for planning future use of soil survey reports.

The origin, purpose and use of soil survey reports in the United States, as well as the importance of farmer education, were included in a review of the literature. According to previous studies, soil survey report information has had an important role in helping farmers do a better job in their farming. Previous studies also confirm that both formal and nonformal education is highly beneficial to farmers in their decision-making and use of improved practices.

In the study at hand, a questionnaire was developed for use with a sample of Michigan farmers. Questionnaires were mailed to 500 persons in five counties whose names and addresses were randomly selected from the mailing list used by the Agricultural Stabilization and Conservation Service. Responses were received from 302 persons of which 201 were farm operators. Two farm characteristics and four farmer characteristics were identified for use in the analysis.

Additional information was secured from the county directors of Cooperative Extension Service and Soil Conservation Districts in each of the five counties. Interviews were conducted by telephone with nine of the ten directors. (One director was unavailable for a telephone interview). These interviews provided insights about the types of soil survey information given to farm operators, soils problems in the areas, and the extent to which farmers were likely using soil survey reports.

All data received from farm operators were transferred

to Computer Data Coding Forms, were punched into Fortran Cards, and placed into CYBER 750 for all analysis. Five hypothesis about farmer awareness, use and perceived usefulness of soil survey reports were tested through the use of chi-square statistical test.

Conclusions

The first objective of this study was to determine the extent to which Michigan farmers were aware of the published modern soil survey reports. It was concluded that more than one-half of the respondents were not aware of published reports. Those who were aware, indicated that the Soil Conservation Service was most frequently the source of such information. None of the farmers indicated that they had used bankers as a source of such information. Some of the farmers, through their written comments, indicated that they first found out about the reports through the present research questionnaire.

One farm characteristic, size of farm, and one farmer characteristic, level of formal education, were found to be associated with awareness of the soil survey reports. The farmers on the larger farms and with the higher levels of formal education were most aware of the reports. No statistically significant association was found between each of four other characteristics (type of farm, age of farmer, occupation of farmer, and years in farming) and awareness of

the reports.

The second objective of the study was to determine if the extent to which Michigan farmers were using soil survey report information. It was found that less than one-fourth of respondents reported use of the soil survey report information. However, all respondents who used the reports indicated that the soil survey reports were useful.

This objective was also examined in terms of two farm characteristics and four farmer characteristics. A significant relationship was found between level of education and use of soil survey report information. It was concluded that as the level of formal education goes up, in general, the likelihood of use of soil survey reports increases. No statistically significant relationship was found between each of the three other characteristics of farmers (age, occupation, years of experience in farming) and use of the soil survey report information.

In terms of farm characteristics, a statistically significant relationship was found between the size of farm and use of the report. As a result of the analyses it was concluded that there is a tendency for individuals who operate larger farms, and who have higher level of formal education to use soil survey reports at a proportionately higher rate than those with smaller farms and less formal education.

The third objective of this study was to examine the extent to which Michigan farmers believe use of soil survey

report information is important in improving agriculture in Michigan. This objective (and hypothesis) concerned itself with the Soil Conservation Service farm plan, which is designed to assist farmers in the best use of their soil. In order to examine the respondents opinions about the effectiveness of the plan, the subset of respondents who were aware of the plan were identified. Less than one-half of the respondents were aware of the plan, but more than one-half of those aware of the plan reported they had used it. Among the users nearly all (98.1%) indicated that the plan was useful.

No statistically significant relationship was found between any of the farm or farmer characteristics and use of the Soil Conservation Service farm plan.

The fourth objective of this study was to examine the extent to which Michigan farmers might be interested in attending soil survey report educational programs. In this part farm/farmer characteristics were analyzed. More than one-half of the respondents indicated interest in attending educational programs based on the soil survey reports. While about ten percent of the respondents indicated they had attended such meetings, nearly three-fourths of those persons reported the meetings were either "useful" or "very useful."

The respondents feelings were measured regarding the distance they were willing to travel to attend, time of year preferred, and preferred length of program.

A significant relationship was found between size of

farm, age, type of farm, years in farming, level of formal education and desire to attend educational programs. The null hypothesis of no relationship as measured by the test instrument was rejected and following results were concluded:

1. As farm size increases the desire to attend soil survey report educational programs tends to go up.
2. Younger farmers tend to be more interested in educational programs.
3. As years of experience in farming increases, there is a tendency for an increases the distance a farmer is willing to travel to attend meeting.
4. Cash crop farmers tend to be more interested in educational programs about soil survey reports than farmers with other interprises.
5. In general the respondents preferred the winter months for educational meetings. Only the more educated farmers tended to favor mon-winter months for educational programs.
6. The most preferred length for educational programs was "1-day," "1/2 day". Mostly dairy farmers preferred the "1/2-day" sessions.

The results of this study have shown that there is an interest in education among farmers in order to best use soil survey report information.

This was confirmed through interviews with county Soil Conservation and Extension Service Directors who revealed that farmers needed training through short classes, meetings, field tours, or slide shows to explain the purposes of the report, what it contains, and how it can be used.

The fifth or last objective of this study was, to examine the extent to which Michigan farmers believe they have received help in using soil survey reports from several

selected farmer-serving organizations?

The questionnaire contained two items dealing with sources for information about soils problems. First, a general question was asked about frequency of use of eight possible sources of information about soils problems. Second, a spicific question about soil management problems was asked with the same eight possible sources listed but the responses were in the form of yes or no.

Based on the data in this study it was concluded that farmers are most likely seek help on soils problems from four sources: Soil Conservation Service, Cooperative Extension Service, other farmers, and commercial salespersons.

The sources of information about general soils problems identified as "Occasional" or "Often" sources were "Other Farmers," "Cooperative Extension Service," "Soil Conservation Service" and "Commercial Sales Persons" (listed in decreasing order of frequencies). The sources where were identified as "Never" or "Seldom" used by the respondents were "Vacational Aquirilture instructor," "Banker," "Consultant," and "News Media."

The four most frequently checked sources of help on soil management problems were "Soil Conservation Service," "Cooperative Extension Service," "Other Farmers," "Commercial Salespersons."

Recommendations

In the review of the literature and personal communications with soil experts at Michigan State University and in the Soil Conservation Service it became apparent that relatively little research regarding farmer use of soil survey report information has been done.

The results of study show that many farmers are unaware of the existence of soil survey reports. Various channels of communication need to be examined to determine which ones are most likely to result in helping farmers become aware of the soil survey reports.

Small acreage holders and less educated farmers should be targets for soil survey report information. Additional research is needed among these two groups to determine the kind of soils information which would be most useful. The cost effectiveness of such a program for these two groups should also be considered.

To educate farmers to better understand and use soil survey reports information, several alternative methods should be considered. The alternative methods should include problem solving, simulated problems, individualized modules, and others. Personnel in both the Cooperative Extension Service and the Soil Conservation Service should plan for alternative methods of helping farmers learn to use the information from soil survey reports.

The literature review indicated that an Extension

Service project using were educated farmers with larger spreads as aides to provide specific education to the less educated neighboring farmers had considerable success. Since it is these less educated farmers with smaller spreads who should be targets for soil survey report information, it is recommended that this educational technique be considered. One-to-one assistance from a successful farmers-neighbor, who has used soil survey reports himself, could prove a powerful tool in disseminating and putting soil survey report information into use.

Additional research needs to be conducted to determine how Cooperative Extension and Soil Conservation personnel are currently helping farmers use soil survey report information. Such a study might include a determination of the extent to which various communication channels are being used and their effectiveness.

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- U.S. Department of Agriculture (1951). Soil Survey Manual. Handbook. No. 18, U.S. GPO. Washington, D.C. p.23-25.

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U.S. Department of Health Education and Welfare. (1978). Vocational Agriculture for Young Farmers. A Planning and Conducting a Program of Instruction in Vocational Agriculture for Young Farmers. (U.S. Government Printing Office). p.4.

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APPENDICES

APPENDIX A

**COPIES OF
LETTERS OF REQUEST FOR RELEASING NAMES
AND ADDRESSES OF FARMERS IN SELECTED
COUNTIES.**

November 14, 1980

Agriculture Stabilization and Conservation Service
United States Department of Agriculture
East Lansing, Michigan 48823

To Whom It May Concern:

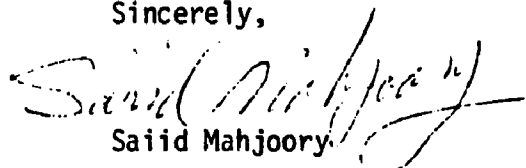
I am a Ph.D. candidate at Michigan State University and working on my dissertation. My dissertation topic is "Study of Farmer Opinions about Soil Survey Reports in Michigan." For this purpose I have selected five counties based on their geographical distribution. In each county 200 farmers will be randomly selected to receive a research questionnaire. Names and addresses of farmers in the following selected counties are needed.

1. Delta County
2. Grand Traverse County
3. Ingham County
4. Sanilac County
5. Ottawa County

Enclosed is a copy of the final research questionnaire. Your consideration as early as possible will be greatly appreciated.

Thank you.

Sincerely,


Saiid Mahjoory

Address

Saiid Mahjoory
1451 A Spartan Village
East Lansing, MI. 48823



UNITED STATES DEPARTMENT OF AGRICULTURE
 AGRICULTURAL STABILIZATION AND CONSERVATION SERVICE
 P. O. BOX 2415 . . . WASHINGTON, D. C. 20013

DEC 3 1980

Mr. Saïd Mahjoory
 1415 A Spartan Village
 East Lansing, Michigan 48823

Dear Mr. Mahjoory:

This is in response to your letter requesting a name and address listing of Agricultural Stabilization and Conservation Service (ASCS) program participants in five specified counties in Michigan.

Your request has been considered in accordance with 7 CFR 1.7. It has been determined that the names and addresses should not be released. The determination is based on the fact that personal data (i.e., addresses) are exempt from mandatory disclosure because release would constitute a clearly unwarranted invasion of personal privacy, within the meaning of 5 U.S.C. 552(b)(6).

You may appeal this decision in writing to the Administrator, ASCS, USDA, P.O. Box 2415, Washington, D.C. 20013, within 45 days from the date of this letter. You should enter "FOIA Appeal" on the envelope and letter to assure prompt handling of your request.

Sincerely,

Wayne K. Lang
 Director,
 Management Services Division

MICHIGAN STATE UNIVERSITY

COLLEGE OF EDUCATION
DEPARTMENT OF SECONDARY EDUCATION AND CURRICULUM
ERICKSON HALL

EAST LANSING • MICHIGAN • 48821

December 4, 1980

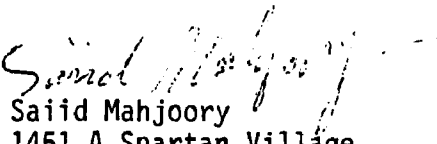
Administrator of Agriculture Stabilization and
Conservation Service
USDA P.O. Box 2415
Washington D.C. 20013

Attention FOIA:

On November 14, 1980 I have requested the names and addresses of the farmers in certain counties in Michigan for my research project (Ph.D. dissertation) under the Department of Agricultural Education at Michigan State University. I have been informed, by telephone, from your local office in East Lansing that my request has been denied. I am appealing that decision.

An additional copy of my research questionnaire is enclosed.

Sincerely,


Saiid Mahjoory
1451 A Spartan Village
East Lansing, MI 48823

SM/jmr

Enclosure

MICHIGAN STATE UNIVERSITY

COLLEGE OF EDUCATION
DEPARTMENT OF SECONDARY EDUCATION AND CURRICULUM
ERICKSON HALL

EAST LANSING • MICHIGAN • 4882

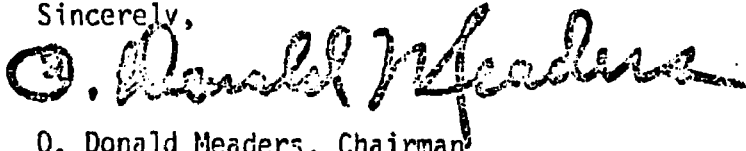
December 4, 1980

To Whom It May Concern:

Saïd Mahjoory is a Ph.D. candidate in the Department of Agricultural Education at Michigan State University. The topic of the research for his dissertation is Study of Farmers Opinions About Soil Survey Report in Michigan. I serve as chairman of his guidance committee and am pleased that he is interested in conducting this research which will benefit both educational and agricultural programs here in Michigan.

If additional information is needed, do not hesitate to call me at 517/355-1691.

Sincerely,

A handwritten signature in dark ink, appearing to read "O. Donald Meaders". The signature is written in a cursive style with a large, stylized "O" at the beginning.

O. Donald Meaders, Chairman
Guidance Committee and
Chairman, Secondary Education and Curriculum

ODM/jmr



UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL STABILIZATION AND CONSERVATION SERVICE
P. O. BOX 2415 . . . WASHINGTON, D. C. 20013

DEC 16 1980

Mr. Said Mahjoory
1415 A Spartan Village
East Lansing, Michigan 48823

Dear Mr. Mahjoory:

This is in response to your appeal of December 4, requesting names and addresses of Agricultural Stabilization and Conservation Service (ASCS) program participants in five specified counties in Michigan.

It is our policy to assist persons involved in studies under the auspices of institutions of higher learning, when the studies are supervised by the institution.

We are advising our Michigan State ASCS Office to authorize the County ASCS Office, only in the five counties you specified, to make the names and addresses available to you upon your request.

We are obliged to emphasize that the names and addresses shall be used for the stated purpose, may not be used for commercial solicitation or political purposes, and may not be released to any other person or organization.

Sincerely,


Acting Administrator Weldon B. Denny

APPENDIX B

COPIES OF

**FIRST AND SECOND REQUEST COVER LETTERS,
QUESTIONNAIRE, AND FIRST AND SECOND THANK
YOU REMINDER CARDS.**



MICHIGAN STATE UNIVERSITY • U.S. DEPARTMENT OF AGRICULTURE & COUNTIES COOPERATING
 GRAND TRAVERSE COUNTY EXTENSION OFFICE • GOVERNMENTAL CENTER
 400 BOARDMAN • TRAVERSE CITY, MICHIGAN 49684 • (616) 941-2258

Dear Grand Traverse County Farmer:

You have been selected in a sample of 500 Michigan farmers to help provide information about farmers and their use of soil survey reports. This research project is sponsored by Michigan State University in cooperation with the Soil Conservation Service.

The purpose of this research project is to help improve agriculture in Michigan through more use of soils information. Therefore, the information you provide by completing the enclosed questionnaire is very important.

We believe the questionnaire will take about twenty minutes to complete. Since your time is very valuable we have tried to make the questionnaire short and easy to answer.

All information in this research project will be kept confidential and no information about individual farms or farmers will be published. Each return envelope has a number. The purpose of the number is to follow-up on those who don't respond.

The Cooperative Extension Service Office is pleased to cooperate with this effort. Please return the completed questionnaire in the self-addressed envelope to the address shown.

Thank you for your cooperation.

Sincerely,

George McManus, Jr.
 County Extension Director

GM/sls

Enclosure

COOPERATIVE EXTENSION SERVICE

MICHIGAN STATE UNIVERSITY
U. S. DEPARTMENT OF AGRICULTURE
SANILAC COUNTY BOARD OF COMMISSIONERS

COOPERATING

SANILAC COUNTY
EXTENSION CENTER
37 AUSTIN

SANDUSKY, MICHIGAN 48871
TELEPHONE 313-648-2518

Dear Sanilac County Farmer:

You have been selected in a sample of 500 Michigan farmers to help provide information about farmers and their use of soil survey reports. This research project is sponsored by Michigan State University in cooperation with the Soil Conservation Service.

The purpose of this research project is to help improve agriculture in Michigan through more use of soils information. Therefore, the information you provide by completing the enclosed questionnaire is very important.

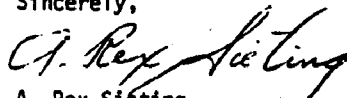
We believe the questionnaire will take about twenty minutes to complete. Since your time is very valuable we have tried to make the questionnaire short and easy to answer.

All information in this research project will be kept confidential and no information about individual farms or farmers will be published. Each return envelope has a number. The purpose of the number is to follow-up on those who don't respond.

The Cooperative Extension Service Office is pleased to cooperate with this effort. Please return the completed questionnaire in the self-addressed envelope to the address shown.

Thank you for your cooperation.

Sincerely,



A. Rex Sieling
County Extension Director

ARS/sls

Enclosure



"COOPERATIVE EXTENSION PROGRAMS ARE OPEN TO ALL WITHOUT REGARD TO RACE, COLOR OR NATIONAL ORIGIN."

COOPERATIVE EXTENSION SERVICE

Michigan State University
U. S. Department of Agriculture and
Ingham County Board of Commissioners
Cooperating

INGHAM COUNTY

Cooperative Extension Bldg.
127 E. Maple St.
Mason, Michigan 48854
Telephone: 876-5222
Walnut Street School
1012 N. Walnut St.
Lansing, Michigan 48901
Telephone: 484-7706

Dear Ingham County Farmer:

You have been selected in a sample of 500 Michigan farmers to help provide information about farmers and their use of soil survey reports. This research project is sponsored by Michigan State University in cooperation with the Soil Conservation Service.

The purpose of this research project is to help improve agriculture in Michigan through more use of soils information. Therefore, the information you provide by completing the enclosed questionnaire is very important.

We believe the questionnaire will take about twenty minutes to complete. Since your time is very valuable we have tried to make the questionnaire short and easy to answer.

All information in this research project will be kept confidential and no information about individual farms or farmers will be published. Each return envelope has a number. The purpose of the number is to follow-up on those who don't respond.

The Cooperative Extension Service Office is pleased to cooperate with this effort. Please return the completed questionnaire in the self-addressed envelope to the address shown.

Thank you for your cooperation.

Sincerely,

Marvin M. Preston

Marvin M. Preston
County Extension Director

MMP/sls

Enclosure

Cooperative Extension Service Programs are open to all
without regard to race, color, national origin or sex.



COOPERATIVE EXTENSION SERVICE**OTTAWA COUNTY**

Michigan State University
U.S. Department of Agriculture and
Ottawa County Board of Commissioners Cooperating

Room 101, County Building
Grand Haven, Michigan 49417
Telephone: (616) 848-8250

Dear Ottawa County Farmer:

You have been selected in a sample of 500 Michigan farmers to help provide information about farmers and their use of soil survey reports. This research project is sponsored by Michigan State University in cooperation with the Soil Conservation Service.

The purpose of this research project is to help improve agriculture in Michigan through more use of soils information. Therefore, the information you provide by completing the enclosed questionnaire is very important.

We believe the questionnaire will take about twenty minutes to complete. Since your time is very valuable we have tried to make the questionnaire short and easy to answer.

All information in this research project will be kept confidential and no information about individual farms or farmers will be published. Each return envelope has a number. The purpose of the number is to follow-up on those who don't respond.

The Cooperative Extension Service office is pleased to cooperate with this effort. Please return the completed questionnaire in the self-addressed envelope to the address shown.

Thank you for your cooperation.

Sincerely,

Lawrence Stebbins
Lawrence Stebbins
County Extension Director

LS/sls

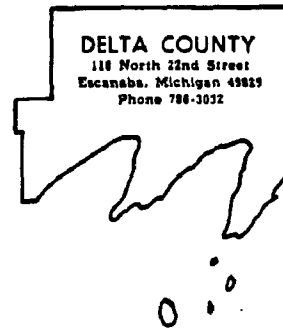
Enclosure



"Programs are open to all without regard to race, color or national origin."

COOPERATIVE EXTENSION SERVICE

Michigan State University
U. S. Department of Agriculture
and Delta County Cooperating



Dear Delta County Farmer:

You have been selected in a sample of 500 Michigan farmers to help provide information about farmers and their use of soil survey reports. This research project is sponsored by Michigan State University in cooperation with the Soil Conservation Service.

The purpose of this research project is to help improve agriculture in Michigan through more use of soils information. Therefore, the information you provide by completing the enclosed questionnaire is very important.

We believe the questionnaire will take about twenty minutes to complete. Since your time is very valuable we have tried to make the questionnaire short and easy to answer.

All information in this research project will be kept confidential and no information about individual farms or farmers will be published. Each return envelope has a number. The purpose of the number is to follow-up on those who don't respond.

The Cooperative Extension Service Office is pleased to cooperate with this effort. Please return the completed questionnaire in the self-addressed envelope to the address shown.

Thank you for your cooperation.

Sincerely,

Don Pellegrini
Delta County Extension Director

DP/sls

Enclosure

"Cooperative Extension Service Programs are open to all without regard to Race, Color or National Origin." County Extension Agents in: Agriculture, and Marketing, Natural Resources and Public Policy, Family Living, 4-H Youth





MICHIGAN STATE UNIVERSITY • U.S. DEPARTMENT OF AGRICULTURE & COUNTIES COOPERATING
 GRAND TRAVERSE COUNTY EXTENSION OFFICE • GOVERNMENTAL CENTER
 400 BOARDMAN • TRAVERSE CITY, MICHIGAN 49684 • (616) 941-2256

Dear Grand Traverse County Farmer:

Several weeks ago we sent to you a questionnaire for our study of farmers opinion in use of soil survey report information. So far we have not received a response from you. To be able to complete this study we need your HELP. In case you have lost or mislaid the other copy of the questionnaire we are enclosing another copy with a return envelope. Your response will help us have more complete set of information. Our recommendations will be better if we can get your opinions.

If you have already responded, please accept our sincere thanks and disregard this letter.

Your help is greatly appreciated. Thank you for your cooperation.

Sincerely,

George A. McManus, Jr.
 George McManus, Jr.
 County Extension Director

GM/sls

Enclosure

COOPERATIVE EXTENSION SERVICE

MICHIGAN STATE UNIVERSITY
U.S. DEPARTMENT OF AGRICULTURE
SANILAC COUNTY BOARD OF COMMISSIONERS

COOPERATING

SANILAC COUNTY
EXTENSION CENTER
37 AUSTIN

SANDUSKY, MICHIGAN 49871
TELEPHONE 313-546-2515

Dear Sanilac County Farmer:

Several weeks ago we sent to you a questionnaire for our study of farmers opinion in use of soil survey report information. So far we have not received a response from you. To be able to complete this study we need your HELP. In case you have lost or mislaid the other copy of the questionnaire we are enclosing another copy with a return envelope. Your response will help us have more complete set of information. Our recommendations will be better if we can get your opinions.

If you have already responded, please accept our sincere thanks and disregard this letter.

Your help is greatly appreciated. Thank you for your cooperation.

Sincerely,

A. Rex Sieling
A. Rex Sieling
County Extension Director

ARS/sls

Enclosure



"COOPERATIVE EXTENSION PROGRAMS ARE OPEN TO ALL WITHOUT REGARD TO RACE, COLOR OR NATIONAL ORIGIN."

COOPERATIVE EXTENSION SERVICE

Michigan State University
U. S. Department of Agriculture and
Ingham County Board of Commissioners
Cooperating

INGHAM COUNTY

Cooperative Extension Bldg.
127 E. Maple St.
Mason, Michigan 48851
Telephone: 676-5222
Walnut Street School
1012 N. Walnut St.
Lansing, Michigan 48906
Telephone: 484-7706

Dear Ingham County Farmer:

Several weeks ago we sent to you a questionnaire for our study of farmers opinion in use of soil survey report information. So far we have not received a response from you. To be able to complete this study we need your HELP. In case you have lost or mislaid the other copy of the questionnaire we are enclosing another copy with a return envelope. Your response will help us have a more complete set of information. Our recommendations will be better if we can get your opinions.

If you have already responded, please accept our sincere thanks and disregard this letter.

Your help is greatly appreciated. Thank you for your cooperation.

Sincerely,

Marvin M. Preston

Marvin M. Preston
County Extension Director

MMP/sls

Enclosure

Cooperative Extension Service Programs are open to all
without regard to race, color, national origin or sex.



COOPERATIVE EXTENSION SERVICE**OTTAWA COUNTY**

Michigan State University
U.S. Department of Agriculture and
Ottawa County Board of Commissioners Cooperating

Room 101, County Building
Grand Haven, Michigan 49417
Telephone: (616) 846-8250

Dear Ottawa County Farmer:

Several weeks ago we sent to you a questionnaire for our study of farmers opinion in use of soil survey report information. So far we have not received a response from you. To be able to complete this study we need your HELP. In case you have lost or mislaid the other copy of the questionnaire we are enclosing another copy with a return envelope. Your response will help us have more complete set of information. Our recommendations will be better if we can get your opinions.

If you have already responded, please accept our sincere thanks and disregard this letter.

Your help is greatly appreciated. Thank you for your cooperation.

Sincerely,

Lawrence Stebbins
Lawrence Stebbins
County Extension Director

LS/sls

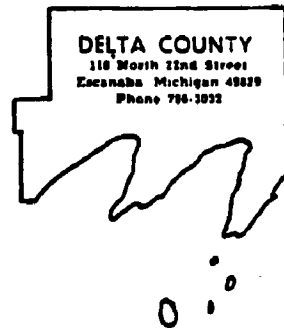
Enclosure



"Programs are open to all without regard to race, color or national origin."

COOPERATIVE EXTENSION SERVICE

Michigan State University
U. S. Department of Agriculture
and Delta County Cooperating



Dear Delta County Farmer:

Several weeks ago we sent to you a questionnaire for our study of farmers opinion in use of soil survey report information. So far we have not received a response from you. To be able to complete this study we need your HELP. In case you have lost or mislaid the other copy of the questionnaire we are enclosing another copy with a return envelope. Your response will help us have more complete set of information. Our recommendations will be better if we can get your opinions.

If you have already responded, please accept our sincere thanks and disregard this letter.

Your help is greatly appreciated. Thank you for your cooperation.

Sincerely,

Don Pellegrini
Delta County Extension Director

DP/sls

Enclosure

"Cooperative Extension Service Programs are open to all without regard to Race, Color or National Origin." County Extension Agents in: Agriculture, and Marketing, Natural Resources and Public Policy, Family Living, 4-H Youth



STUDY OF FARMER OPINIONS ABOUT SOIL SURVEY REPORTS IN MICHIGAN

Directions: Please respond to each question as it is requested and check the appropriate place for each question.

PART A: Questions about your farm, about you, and about soil problems

1. How many years have you farmed? _____
2. How many total acres did you farm during the 1979-80 farm years? _____
 - 2-1. Total acres owned? _____
 - 2.2. Total acres rented? _____
3. Type of farm (Please check any type which applies to your farm)
 - ☐ cash crop
 - ☐ swine
 - ☐ beef
 - ☐ dairy
 - ☐ poultry
 - ☐ general livestock
 - ☐ fruit
 - ☐ Other (please specify) _____
4. Are you employed in any other job?
 - ☐ No
 - ☐ Yes
 - 4.1 If yes, what is your other occupation? _____
5. Your educational level completed
 - ☐ Less than high school diploma
 - ☐ High school
 - ☐ 1-2 years college diploma
 - ☐ Bachelor's diploma (please give field of study) _____
 - ☐ Graduate degree (please give field of study) _____
6. What is your age group?
 - ☐ 25 and under
 - ☐ 26-34
 - ☐ 35-44
 - ☐ 45-54
 - ☐ 55-64
 - ☐ 65 and over
7. Now we would like to know about your discussion of soil problems with anyone during the past five years. Please check each group and indicate how frequently you have discussed soil problems with each group.

Groups	Frequency of Discussion			
	Never	Seldom	Occasionally	Often
Cooperative Extension Service Personnel				
Soil Conservation Service Personnel				
Vocational Agriculture Instructor				
Banker				
Consultant				
Commercial salesperson				
Other farmers				
News media (newspaper, radio or TV)				
None of the above				
Others (please specify)				

8. How often do you take soil samples for soil testing from a particular field

- ☐ every 2-3 years
☐ every 4-6 years
☐ every 7-10 years
☐ every 10-15 years
☐ never

PART B: Questions about the County Soil Survey Report

9. Do you know that there is a modern soil survey report published for your county?

- ☐ No
☐ Yes

9-1. If yes, how did you find out about the report?

- ☐ Cooperative Extension Service (CES) Personnel
☐ Soil Conservation Service (SCS) Personnel
☐ Vocational Agriculture Instructor
☐ Banker
☐ Consultant
☐ Commercial salesperson
☐ Other farmers
☐ News media (newspaper, radio, or TV)
☐ None of the above
☐ Other (Please specify) _____

10. Have you used information from the modern published soil survey report?

- ☐ No (If you check No, proceed to 10-2)
☐ Yes

10-1. If yes, was it helpful?

- ☐ No
☐ Yes

10-2. If no, please indicate your reason in a short statement _____

11. If you have tried to use soil survey report information, was it difficult to understand?

- ☐ No
☐ Yes

11-1. If yes, to which organization (e.g., SCS or CES) or other individuals did you go for help? _____

PART C. Questions about your soil management problems and interest in educational programs.

12. Have you been faced with some soil management problems such as erosion, compaction, fertilizer or septic tank system?

- ☐ No
☐ Yes

12-1. If yes, where did you get information and help? (Please check as many as you got help from)

- ☐ Cooperative Extension Service Personnel
☐ Soil Conservation Service Personnel
☐ Vocational Agriculture Instructor
☐ County Health Department
☐ Banker
☐ Consultant
☐ Commercial Salesperson
☐ Other Farmers
☐ News media (newspaper, radio or TV)
☐ Others (please specify) _____

13. If there were an educational program in using modern soil survey report information, would you like to attend?

☐ No
☐ Yes

- 13-1. If yes, how far would you travel to attend such a meeting?

☐ Less than 20 miles
☐ 20-40 miles
☐ 40-60 miles
☐ 60-80 miles
☐ It does not matter

- 13-2. In Question 13, if you marked yes, what time of year is best for you? (Please check only one box).

☐ December, January, February
☐ March, April, May
☐ June, July, August
☐ September, October, November.

- 13-3. What length of program would be best for you (please check only one)

☐ 1/2-day
☐ 1-day
☐ 2-days
☐ Others (please specify) _____

14. Have you attended any educational programs which presented use of soil survey report information?

☐ No
☐ Yes

- 14-1. If yes, how useful was it?

☐ Very useful
☐ Useful
☐ Fair
☐ Not useful

PART D. Questions about Soil Conservation Farm Plans

15. Do you know that the Soil Conservation Service has a farm plan program to assist each individual farmer in the best use of his/her soils?

☐ No (If you check No, proceed to comments at the end.)
☐ Yes

- 15-1. If yes, have you used it

☐ No
☐ Yes

- 15-2. If yes, how useful was it

☐ Great
☐ Medium
☐ Little
☐ None

- 15-3. If yes, how did you find out about the farm plan?

☐ Cooperative Extension Service Personnel
☐ Soil Conservation Service Personnel
☐ Vocational Agriculture Instructor
☐ Banker
☐ Consultant
☐ Commercial Salesperson
☐ Other farmer
☐ News media (newspaper, radio or TV)
☐ None of the above
☐ Others (please specify) _____

Comments: _____

Thank you for completing this questionnaire. Please use the enclosed stamped and self-addressed envelope to return the questionnaire to:

Agricultural and Natural Resources Education
Michigan State University
Erickson Hall
East Lansing, MI. 48824

First Thank you/Reminder Card

We want to express our thanks for your cooperation completing the questionnaire recently sent to you. The responses from you and other farmers will help strengthen use of soil survey report information in Michigan.

Sincerely,

County Extension Director

P.S. If you have not yet completed the questionnaire please complete it and put it in the mail at your earliest convenience. Thanks.

Second Thank you/Reminder Card

Your cooperation is appreciated. The completed questionnaires have provided valuable information for the purpose of research and recommendations about use of soil survey report information in Michigan.

Sincerely,

County Extension Director

P.S. Perhaps your questionnaire is one of the few still not received. I hope it is now in the mail.
Thanks.

APPENDIX C

**COPIES OF COVER LETTER FOR COUNTY
DIRECTORS (CES & SCS) AND GENERAL
QUESTIONS.**

July 11, 1981

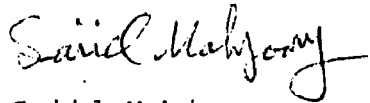
Dear County Extension/Soil Conservation District Director:

I would like to get your opinions about the use of soil survey report information by Michigan farmers in your county. Your cooperation will help to complete the collection of our research data.

For this purpose I would like to get your response to some questions about this subject matter. Please read the attached material. You may want to complete the response. However, I will contact you by telephone on or after July 24. At that time I would like to either discuss the questionnaire with you or arrange a definite time for another telephone call.

If you have any questions, please feel free to contact me at (517) 355-1691. I am looking forward to my telephone discussion with you.

Sincerely,

A handwritten signature in cursive script, reading "Said Mahjoory".

Said Mahjoory
Graduate Research Assistant
Michigan State University

A. YOUR IDEAS ABOUT MAJOR SOILS PROBLEMS FACED BY FARMERS IN YOUR COUNTRY.

1. Here are several categories of common soils problems. How important is each of these as an area of problems in your country:

	not a problem	problem for some but not a majority	problem for many but not all	problem of all
1.1 Erosion				
1.2 Compaction				
1.3 Drainage				
1.4 Fertility				
1.5 pH				
1.6 other				

B. INFORMATION ABOUT THE SOIL SURVEY REPORT:

Now we want to get information about the farmers and the soil survey report. We have several questions which will help us get a better understanding about the value, use and usefulness of the report.

- 2.0 Have any farmers ever asked for information about the soil survey report?

No _____ Yes _____

- 2.1 If yes, approximately how many farmers during the past two years? _____

C. INFORMATION ABOUT FARMERS AND FARM:

In each country there are many farmers--some full-time, some part-time, some with much formal schooling, some with little formal schools, some young, and some old.

3.0 Who are the farmers who most frequently seek information/
help from you about soil survey report?

	Never	Seldom	Occasionally	Often
3.1 Full-time farmers				
3.2 Part-time farmers				
3.3 With high school education or less				
3.4 With more than high school education				
3.5 Age 34 and under				
3.6 Age 35-60				
3.7 Over age 60				
3.8 On farm under 250 acres				
3.9 On farm over 250-500 acres				
3.10 On farm over 500 acres				

4.0 In your opinion, how often do farmers seek information
about the soil survey report from other sources?

Sources	Frequency of Information			
	Never	Seldom	Occasionally	Often
Cooperative Extension Service Personnel				
Soil Conservation Service Personnel				
Vocational Agriculture Instructor				
Banker				
Consultant				
Commercial salesperson				
Other farmers				
New Media (newspaper, radio, or T.V.)				
None of the above				
Others (please specify)				

D. FARMERS AND THEIR USE OF SOIL SURVEY REPORTS.

5.0 In your opinion, can farmers use the reports on soils maps without additional help?

No _____ Yes _____

5.1 If they need additional help...

5.11 What kinds of problems do you think they need help with?

5.12 What help has your office been able to provide to the farmers for use of the soil survey report?

6.0 How helpful are the reports to farmers?

7.0 How important, or how high a priority do you place on helping farmers to use soil survey reports?

- Very low priority _____
- Provide help only when requests are received _____
- Have planed to provide help this year as part of our overall plan _____
- Other _____

Comments:

E. EDUCATIONAL/TECHNICAL HELP FROM YOUR OFFICE.

8.0 Now we would like to know more about the ways in which your, or others from your office, provide help to the farmers to use the soil survey report.

9.0 What change would you like to see in your program of activities in the future to help convince farmers that soil survey information can be useful to them.

APPENDIX D

COMPUTER PROGRAM

VOGELBACK COMPUTING CENTER
NORTHWESTERN UNIVERSITY

S P S S - - STATISTICAL PACKAGE FOR THE SOCIAL SCIENCES

VERSION 8.0 MSU JUNE 18, 1979

RUN NAME SAIDS CROSSTABS
VARIABLE LIST ID,C,V1 TO V68
INPUT FORMAT FIXED(1F3.0,1F1.0,1F2.0,1F4.0,4X,66F1.0)

ACCORDING TO YOUR INPUT FORMAT, VARIABLES ARE TO BE READ AS FOLLOWS

VARIABLE	FORMAT	RECORD	COLUMNS
ID	F 3. 0	1	1- 3
C	F 1. 0	1	4- 4
V1	F 2. 0	1	5- 6
V2	F 4. 0	1	7- 10
V3	F 1. 0	1	15- 15
V4	F 1. 0	1	16- 16
V5	F 1. 0	1	17- 17
V6	F 1. 0	1	18- 18
V7	F 1. 0	1	19- 19
V8	F 1. 0	1	20- 20
V9	F 1. 0	1	21- 21
V10	F 1. 0	1	22- 22
V11	F 1. 0	1	23- 23
V12	F 1. 0	1	24- 24
V13	F 1. 0	1	25- 25
V14	F 1. 0	1	26- 26
V15	F 1. 0	1	27- 27
V16	F 1. 0	1	28- 28
V17	F 1. 0	1	29- 29
V18	F 1. 0	1	30- 30
V19	F 1. 0	1	31- 31
V20	F 1. 0	1	32- 32
V21	F 1. 0	1	33- 33
V22	F 1. 0	1	34- 34
V23	F 1. 0	1	35- 35
V24	F 1. 0	1	36- 36
V25	F 1. 0	1	37- 37
V26	F 1. 0	1	38- 38
V27	F 1. 0	1	39- 39
V28	F 1. 0	1	40- 40
V29	F 1. 0	1	41- 41
V30	F 1. 0	1	42- 42
V31	F 1. 0	1	43- 43
V32	F 1. 0	1	44- 44
V33	F 1. 0	1	45- 45
V34	F 1. 0	1	46- 46
V35	F 1. 0	1	47- 47
V36	F 1. 0	1	48- 48
V37	F 1. 0	1	49- 49
V38	F 1. 0	1	50- 50
V39	F 1. 0	1	51- 51
V40	F 1. 0	1	52- 52
V41	F 1. 0	1	53- 53
V42	F 1. 0	1	54- 54
V43	F 1. 0	1	55- 55
V44	F 1. 0	1	56- 56
V45	F 1. 0	1	57- 57
V46	F 1. 0	1	58- 58
V47	F 1. 0	1	59- 59
V48	F 1. 0	1	60- 60
V49	F 1. 0	1	61- 61
V50	F 1. 0	1	62- 62
V51	F 1. 0	1	63- 63

ACCORDING TO YOUR INPUT FORMAT, VARIABLES ARE TO BE READ AS FOLLOWS

VARIABLE	FORMAT	RECORD	COLUMNS
V52	F 1. 0	1	64- 64
V53	F 1. 00	1	65- 65
V54	F 1. 0	1	66- 66
V55	F 1. 00	1	67- 67
V56	F 1. 00	1	68- 68
V57	F 1. 00	1	69- 69
V58	F 1. 00	1	70- 70
V59	F 1. 00	1	71- 71
V60	F 1. 00	1	72- 72
V61	F 1. 00	1	73- 73
V62	F 1. 00	1	74- 74
V63	F 1. 00	1	75- 75
V64	F 1. 00	1	76- 76
V65	F 1. 00	1	77- 77
V66	F 1. 00	1	78- 78
V67	F 1. 0	1	79- 79
V68	F 1. 0	1	80- 80

THE INPUT FORMAT PROVIDES FOR 70 VARIABLES. 70 WILL BE READ.

IT PROVIDES FOR 1 RECORDS (*CARDS*) PER CASE.

A MAXIMUM OF 80 *COLUMNS* ARE USED ON A RECORD.

N OF CASES

UNKNOWN

VAR LABELS

ID,V1,YRSFARM/V2,SIZEFRM/V3,OTHJOB/V4,LEVELED/V5,GRPAGE/
V6,PCOOP/V7,PSCS/V8,PVO/V9,PBNK/V10,PCONS/V11,PCOM/
V12,PFRMP/V13,PNEWS/V14,PNON/V15,POTHR/V16,TEST/V17,KNO/
V18,FCCOOP/V19,FSCS/V20,FVO/V21,FBNK/V22,FCONS/V23,FCON/
V24,FFRMR/V25,FNEWS/V26,FNON/V27,FOTHR/V28,USINF/V29,HLP/
V30,DIFF1/V31,MGT/V32,WCOOP/V33,WSCS/V34,WVO/V35,WCHD/
V36,WBNK/V37,WCONS/V38,WCOM/V39,WFRMR/V40,WNEWS/V41,WOT/
V42,ATTEN/V43,FARTR/V44,TIMYR/V45,LENGH/V46,PRSNT/
V47,HOUSE/V48,FRMPL/V49,USDIT/V50,USFUL/V51,PCOOP/
V52,PSCS/V53,PVO/V54,PBNK/V55,PCONS/V56,PCOM/V57,PFRMR/
V58,PNEWS/V59,PNON/V60,POT/V61,CASH/V62,SWINE/V63,BEEF/
V64,DAIRY/V65,PCULT/V66,LIVSTK/V67,FRUIT/V68,OTHS/
V2 (1 THRU 49=1) (50 THRU 179=2) (180 THRU 499=3) (500 THRU 999=4)

RECODE

(1000 THRU 1999=5) (2000 THRU HIGHEST=6)

RECODE

V1 (1 THRU 5=1) (6 THRU 15=2) (16 THRU 25=3) (26 THRU 40=4)
(41 THRU HIGHEST=5)

MISSING VALUES

ALL (BLANK)

IF

(V61 EQ 1) KIND=1

IF

(V62 EQ 1) KIND=2

IF

(V63 EQ 1) KIND=3

IF

(V64 EQ 1) KIND=4

IF

(V65 EQ 1) KIND=5

IF

(V66 EQ 1) KIND=6

IF

(V67 EQ 1) KIND=7

IF

(V68 EQ 1) KIND=8

CROSSTABS

TABLES=V1,V4,V5,V6 BY V28

STATISTICS

1,2,3,6,7

CROSSTABS

TABLES=V2,V61 TO V68 BY V28

STATISTICS

1,2,3,6,7

CROSSTABS

TABLES=V50 BY V1,V4,V5,V6,V2

STATISTICS

1,2,3,6,7

CROSSTABS

TABLES=V50 BY V61 TO V68

STATISTICS

1,2,3,6,7

CROSSTABS

TABLES=V42 TO V45 BY V1,V4,V5,V6

STATISTICS

1,2,3,6,7

CROSSTABS

TABLES=V42 TO V45 BY V2,V61 TO V68

STATISTICS

1,2,3,6,7

CROSSTABS

TABLES=V17 BY V1,V4,V5,V6

STATISTICS

1,2,3,6,7

CROSSTABS

TABLES=V17 BY V2,V61 TO V68

STATISTICS

1,2,3,6,7

CROSSTABS

TABLES=V28 BY V3,V7 TO V15,V31 TO V41

STATISTICS

1,2,3,6,7

READ INPUT DATA

FINISH

APPENDIX E

**TABLES SHOWING NUMBER AND PERCENT OF
RESPONDENTS BY AGE GROUPS AND SIZE OF
FARM IN EACH OF FIVE COUNTIES.**

TABLE E-1. Number and Percent of Respondents by Age Group and County.

Age Group	County									
	Delta		G.T.		Ingham		Ottawa		Sanilac	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Under 25	7	2.10	6	1.25	22	2.05	39	2.50	80	4.05
25 - 34	45	13.50	58	11.90	136	12.75	253	16.15	266	13.50
35 - 44	71	21.40	100	20.50	260	24.35	374	23.85	403	20.45
45 - 54	80	24.10	128	26.30	277	25.95	374	23.85	494	25.10
55 - 64	69	20.80	109	22.40	218	20.45	332	21.15	441	22.40
65+	60	18.10	86	17.65	154	14.45	196	12.50	285	14.50
Total	332	100.00	487	100.00	1067	100.00	1568	100.00	1969	100.00

TABLE E-2. Size of Farms by Counties.

Counties	County									
	Delta		G.T.		Ingham		Ottawa		Sanilac	
Size of farm	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
1- 49	32	9.65	98	20.10	297	27.85	630	39.70	312	15.85
50- 179	121	36.45	254	52.20	412	38.60	655	41.20	766	38.90
180- 499	131	37.45	110	22.60	266	24.90	260	16.40	694	35.25
500- 999	39	11.75	21	4.30	61	5.70	33	2.10	157	7.95
1000-1999	8	2.40%	4	.80%	8	.50	8	.50	37	1.90
2000+	1	.30%	—	.00	10	.95	2	.10	3	.15
Total	332	100.00	487	100.00	1067	100.00	1588	100.00	1969	100.00

APPENDIX F

TABLES WITH NUMBER AND PERCENT OF
RESPONDENTS FOR EACH TYPE OF FARM AND USE
OF SOIL SURVEY REPORT.

TABLE F-1. Number and Percent of Respondents by Type of Farm (Cash Crop) and Use of Soil Survey Report.

Type of Farm (cash crop)	<u>Use of Soil Survey Report</u>					
	<u>No</u>		<u>Yes</u>		<u>Total</u>	
	Number	Percent	Number	Percent	Number	Percent
No	63	32.8	14	7.1	77	39.1
Yes	84	42.6	36	18.3	120	60.9
TOTAL	147	74.6	50	25.4	197	100.0

$$\chi^2 = 2.863 \quad \text{d.f.} = 1 \quad \text{Significance} = .0906$$

Number of missing observations = 4

TABLE F-2. Number and Percent of Types of Farm (Swine) and Use of Soil Survey Report.

Type of Farm (swine)	<u>Use of Soil Survey Report</u>					
	<u>No</u>		<u>Yes</u>		<u>Total</u>	
	Number	Percent	Number	Percent	Number	Percent
No	137	69.5	44	22.3	181	91.9
Yes	10	5.1	6	3.0	16	8.1
TOTAL	147	74.6	50	25.4	197	100.0

$$\chi^2 = .743 \quad \text{d.f.} = 1 \quad \text{Significance} = .388$$

Number of missing observations = 4

TABLE F-3. Number and Percent of Type of Farm (Beef) and Use of Soil Survey Reports.

Type of Farm (beef)	<u>Use of Soil Survey Report</u>					
	<u>No</u>		<u>Yes</u>		<u>Total</u>	
	Number	Percent	Number	Percent	Number	Percent
No	122	61.9	36	18.3	158	80.2
Yes	25	12.7	14	7.1	39	19.8
TOTAL	147	74.6	50	25.4	197	100.0

$$\chi^2 = 2.189 \quad \text{d.f.} = 1 \quad \text{Significance} = .138$$

Number of missing observations = 4

TABLE F-4. Number and Percent of Types of Farm (Dairy) and Use of Soil Survey Reports.

Type of Farm (dairy)	<u>Use of Soil Survey Report</u>					
	<u>No</u>		<u>Yes</u>		<u>Total</u>	
	Number	Percent	Number	Percent	Number	Percent
No	115	58.4	40	20.3	155	78.7
Yes	32	16.2	10	5.1	42	21.3
TOTAL	147	74.6	50	25.4	197	100.0

$$\chi^2 = .004 \quad \text{d.f.} = 1 \quad \text{Significance} = .949$$

Number of missing observations = 4

TABLE F-5. Number and Percent of Type of Farm (Poultry) and Use of Soil Survey Reports.

Type of Farm (poultry)	<u>Use of Soil Survey Report</u>					
	<u>No</u>		<u>Yes</u>		<u>Total</u>	
	Number	Percent	Number	Percent	Number	Percent
No	137	69.5	47	23.9	184	93.4
Yes	10	5.1	3	1.5	13.	6.6
TOTAL	147	74.6	50	25.4	197	100.0

$\chi^2 = 0$ d.f. = 1 Significance = 1

Number of missing observations = 4

TABLE F-6. Number and Percent of Type of Farm (General Livestock) and Use of Soil Survey Reports.

Type of Farm (G.livestock)	<u>Use of Soil Survey Report</u>					
	<u>No</u>		<u>Yes</u>		<u>Total</u>	
	Number	Percent	Number	Percent	Number	Percent
No	135	68.5	48	24.4	183	92.9
Yes	12	6.1	2	1.0	14	7.1
TOTAL	147	74.6	50	25.4	197	100.0

$\chi^2 = .45$ d.f. = 1 Significance = .502

Number of missing observations = 4

TABLE F-7. Number and Percent of Type of Farm (Fruit) and Use of Soil Survey Reports.

Type of Farm (fruit)	<u>Use of Soil Survey Report</u>					
	<u>No</u>		<u>Yes</u>		<u>Total</u>	
	Number	Percent	Number	Percent	Number	Percent
No	134	68.0	48	24.4	182	92.4
Yes	13	6.6	2	1.0	15	7.6
TOTAL	147	74.6	50	25.4	197	100.0

$$\chi^2 = .6509 \quad \text{d.f.} = 1 \quad \text{Significance} = .419$$

Number of missing observations = 4

TABLE F-8. Number and Percent of Type of Farm (Others) and Use of Soil Survey Reports.

Type of Farm (others)	<u>Use of Soil Survey Report</u>					
	<u>No</u>		<u>Yes</u>		<u>Total</u>	
	Number	Percent	Number	Percent	Number	Percent
No	128	65.0	46	23.4	174	88.3
Yes	19	9.6	4	2.0	23	11.7
TOTAL	147	74.6	50	25.4	197	100.0

$$\chi^2 = .465 \quad \text{d.f.} = 1 \quad \text{Significance} = .495$$

Number of missing observations = 4

APPENDIX G

**TABLES WITH NUMBER AND PERCENT OF
RESPONDENTS FOR EACH TYPE OF FARM AND
USEFULNESS OF FARM PLAN.**

TABLE G-1. Number and Percent of Usefulness of the Farm Plan and Type of Farm (Cash Crop).

Usefulness of the Farm Plan (cash crop)	<u>Type of Farm</u>					
	<u>No</u>		<u>Yes</u>		<u>Total</u>	
	Number	Percent	Number	Percent	Number	Percent
Great	9	17.3	9	17.3	18	34.6
Medium	7	13.5	20	38.5	27	51.9
Little	2	3.8	4	7.7	6	11.5
None	0	0.0	1	1.9	1	1.9
TOTAL	18	34.6	34	65.4	52	100.0

$$\chi^2 = 3.316 \quad \text{d.f.} = 3 \quad \text{Significance} = .34$$

$$\text{Cramer's } V = .25256$$

TABLE G-2. Number and Percent of Usefulness of the Farm Plan and Type of Farm (Swine).

Usefulness of the Farm Plan (swine)	<u>Type of Farm</u>					
	<u>No</u>		<u>Yes</u>		<u>Total</u>	
	Number	Percent	Number	Percent	Number	Percent
Great	17	32.7	1	1.9	18	34.6
Medium	26	50.0	1	1.9	27	51.9
Little	5	9.6	1	1.9	6	11.5
None	1	1.9	0	0	1	1.9
TOTAL	49	94.2	3	5.8	52	100.0

$$\chi^2 = 1.585 \quad \text{d.f.} = 3 \quad \text{Significance} = .66$$

$$\text{Cramer's } V = .17460$$

TABLE G-3. Number and Percent of Usefulness of the Farm Plan and Type of Farm (Beef).

Usefulness of the Farm Plan (beef)	<u>Type of Farm</u>					
	<u>No</u>		<u>Yes</u>		<u>Total</u>	
	Number	Percent	Number	Percent	Number	Percent
Great	13	25.0	5	9.6	18	34.6
Medium	24	46.2	3	5.8	27	51.9
Little	5	9.6	1	1.9	6	11.5
None	1	1.9	0	0	1	1.9
TOTAL	43	82.7	9	17.3	52	100.0

$$\chi^2 = 2.314 \quad \text{d.f.} = 3 \quad \text{Significance} = .5$$

$$\text{Cramer's } V = .21095$$

TABLE G-4. Number and Percent of Usefulness of the Farm Plan and Type of Farm (Dairy).

Usefulness of the Farm Plan (dairy)	<u>Type of Farm</u>					
	<u>No</u>		<u>Yes</u>		<u>Total</u>	
	Number	Percent	Number	Percent	Number	Percent
Great	14	26.9	4	7.7	18	34.6
Medium	23	44.2	4	7.7	27	51.9
Little	6	11.5	0	0	6	11.5
None	1	1.9	0	0	1	1.9
TOTAL	44	84.6	8	15.4	52	100.0

$$\chi^2 = 1.925 \quad \text{d.f.} = 3 \quad \text{Significance} = .58$$

$$\text{Cramer's } V = .19245$$

TABLE G-5. Number and Percent of Usefulness of the Farm Plan and Type of Farm (Poultry).

Usefulness of the Farm Plan (poultry)	<u>Type of Farm</u>					
	<u>No</u>		<u>Yes</u>		<u>Total</u>	
	Number	Percent	Number	Percent	Number	Percent
Great	17	32.7	1	1.9	18	34.6
Medium	25	48.1	2	3.8	27	51.9
Little	5	9.6	1	1.9	6	11.5
None	1	1.9	0	0	1	1.9
TOTAL	48	92.3	4	7.7	52	100.0

$\chi^2 = .882$ d.f. = 3 Significance = .82

Cramer's V = .19245

TABLE G-6. Number and Percent of Usefulness of the Farm Plan and Type of Farm (General Livestock).

Usefulness of the Farm Plan (G.livestock)	<u>Type of Farm</u>					
	<u>No</u>		<u>Yes</u>		<u>Total</u>	
	Number	Percent	Number	Percent	Number	Percent
Great	17	32.7	1	1.9	18	34.6
Medium	27	51.9	0	0	27	51.9
Little	6	11.5	0	0	6	11.5
None	1	1.9	0	0	1	1.9
TOTAL	51	98.1	1	1.9	52	100.0

$\chi^2 = 1.925$ d.f. = 3 Significance = .58

Cramer's V = .19245

TABLE G-7. Number and Percent of Usefulness of the Farm Plan and Type of Farm (Fruit).

Usefulness of the Farm Plan (fruit)	<u>Type of Farm</u>					
	<u>No</u>		<u>Yes</u>		<u>Total</u>	
	Number	Percent	Number	Percent	Number	Percent
Great	14	26.9	4	7.7	18	34.6
Medium	23	44.2	4	7.7	27	51.9
Little	5	9.6	1	1.9	6	11.5
None	1	1.9	0	0	1	1.9
TOTAL	43	82.7	9	17.3	52	100.0

$$\chi^2 = .632 \quad \text{d.f.} = 3 \quad \text{Significance} = .88$$

$$\text{Cramer's } V = .11025$$

TABLE G-8. Number and Percent of Usefulness of the Farm Plan and Type of Farm (Others).

Usefulness of the Farm Plan (others)	<u>Type of Farm</u>					
	<u>No</u>		<u>Yes</u>		<u>Total</u>	
	Number	Percent	Number	Percent	Number	Percent
Great	15	28.8	3	5.8	18	34.6
Medium	26	50.0	1	1.9	27	51.9
Little	6	11.5	0	0	6	11.5
None	1	1.9	0	0	1	1.9
TOTAL	47	90.4	5	9.6	52	100.0

$$\chi^2 = 2.565 \quad \text{d.f.} = 3 \quad \text{Significance} = .46$$

$$\text{Cramer's } V = .22210$$