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Major professor

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# PERCEPTION OF ORGANIC FARMING IN MICHIGAN

By

Ali Naemi

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ABSTRACT

PERCEPTION OF ORGANIC FARMING IN MICHIGAN

By

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According to the literature review most of the Michigan farms are operated "inorganically" (also known as conventional and commercial). Inorganic agriculture has proven to be the largest source of water pollution, soil erosion, pest resistance, and pesticide residues in food. In addition, it is the most costly and energy inefficient system of agriculture. Organic farming makes no use of synthetic fertilizers, pesticides, and growth regulators. Its goals are to decrease harm to the environment and human health, while providing a basis for a sustainable agricultural system. Furthermore, study has shown that organic farming can potentially be as productive and profitable as inorganic agriculture. But not many farmers have chosen to grow crops organically. This indicates there are constraints on the adoption of organic farming, or the perception that it is not feasible. The objectives of this study were: a) to document the overall situation of organic farming in Michigan; b) identify and evaluate major challenges faced by organic farmers in Michigan; and c) suggest actions that would promote organic farming in Michigan.

A telephone interview method was used to collect data for this study. A sample size of 60 farmers was drawn randomly from a total of 185 organic farmers listed in

"Eating Organically", a directory of Michigan organic farmers. The data was analyzed using descriptive, and inferential statistics.

The study found that organic farming is a relatively new phenomenon in Michigan. Most of the respondents had only a few years of experience in organic farming. Labor intensity of organic farming was considered as a major constraint by majority of the respondents. No other serious constraints to organic farming were identified. Substitute for inorganic inputs such as chemical fertilizers and pesticides was not found to be a problem. According to respondents, the productivity and profitability of organic farming in Michigan were perceived to be similar to that of inorganic farming. Marketing of organic products was not found to be a major problem. Respondents indicated that experienced organic farmers were the most useful source of information on organic farming. Being certified as an organic farmer was not found to be a determining factor for gaining a better market, or higher prices at home in Michigan. However, it was considered to be a necessity for those seeking export market. More than half of the respondents perceived organic farming to be as productive and profitable as inorganic farming in Michigan. Majority of the respondents felt that organic farming can become a major farming system in Michigan if it receives as much attention as inorganic farming does from farmers, scientists, and consumers.

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# INTRODUCTION

## Background

In the past several decades, the American farm system has geared itself towards being an export agriculture with the goal of maximizing productivity (Papendick, 1989). To achieve this goal, it has followed a course radically distanced from that of biodynamic and organic farming (Koepf, 1989). Today, fewer U.S. farmers feed more people than ever before. At U.S. consumption rates, one American wheat farmer can easily produce enough grain annually for 10,000 people (Papendick, 1989). But this success has not come without cost. There is much evidence today that American agriculture is being seriously threatened by over-production of certain crops, loss of foreign markets, costs of production higher than selling prices, and increased cases of farm-related bankruptcies and foreclosures. And it is evident that the current farming practices are resulting in extensive damage to natural resources and an undesirable disruption of social structure (Papendick, 1989).

Because of these concerns, many farmers have adopted alternative practices and systems that will reduce input costs, preserve the resource base, and protect human health (National Research Council, 1989). One of these alternative systems is known as organic farming.

Organic agriculture as the term used in this study designates farming practices that make no use of chemicals in the form of fertilizers and pesticides. Further, it refers to a system which can sustain itself through applications of design and management procedures that work with natural processes to conserve all resources and minimize waste and environmental damages, while maintaining or improving farm productivity and profitability (MacRae et al., 1990).

**Significance of the Study**

In recent years, organic farming has gained attention as an alternative approach to conventional agriculture in the US. However, as the literature review indicates, the trend has been more progressive in some states such as California, and less in others, like Michigan. According to Michigan Agricultural Statistics, 1995, there are 54,000 farms with a size of 10,700,000 acres being farmed in Michigan (Michigan Department of Agriculture, 1995). There are only 185 farms (less than 0.4% of the total Michigan farmers) listed as organic in Michigan's organic farmer's directory (MOFFA, 1996/1997). This indicates that there are either constraints on the adoption of organic farming, or the perception that organic farming is not as productive and profitable as conventional farming in Michigan. Exploring the problems and/or benefits of organic farming in Michigan is vital to its proper understanding. Further, it will help promote organic farming in Michigan through further studies, proper program planning, and policy-formation.

**Objectives of the Study**

Farmers have a unique perspective on research problems. Their dependence on farming makes them more likely to regard specific problems as more important than macro-economic or broad social issues. Farmers, particularly organic farmers, work under circumstances that may be unfamiliar to agricultural scientists with commercial farm experience (Baker at al., 1987). Scientists tend to set their research agenda based on their personal, social and economic considerations not necessarily related to the perceived or real needs of farmers (Busch and Lacy, 1983). This is not to suggest that there is a particular hostility or resistance towards farmers' suggestions on the part of scientists. Rather, it reflects the institutional failure of the Land Grand Universities and State Agricultural Experiment Stations systems to provide efficient mechanisms to help facilitate communication between farmers and scientists (Dahlberg, 1986). Identification of problems is not the ultimate solution for promoting a system. It is only the first step towards exploring potential solutions. The objectives of this study are to:

1. Provide documentation of the present situation of organic farming in Michigan,
2. Identify and evaluate major challenges faced by organic farmers in Michigan, and
3. Suggest actions that would promote organic farming in Michigan.

**Limitations of the Study**

This study had the following limitations:

1. The population under this study were those organic farmers who were listed in "Eating Organically, a directory of, and guide to Michigan organic food producers and related business", complied and published by Michigan Organic Food and Farm Alliances (MOFFA, 1996). There could have been other unlisted organic farmers who were not considered as part of the population for this study.
2. Due to the above limitation, no valid generalization could be made to other organic farmers in Michigan that were not included in the directory.

**Definitions of Terms**

**Alternative Agriculture:** Refers to farming practices that avoid or at least minimize the use of non-renewable production input such as synthetically compounded fertilizers, pesticides and herbicides (Anderson, 1985).

**Certified Organic:** This " is a term that assures the consumer that food and fiber products have been grown, processed and/or handled in compliance with standards designed to keep the products, agricultural workers, food handlers and the environment free of harmful contaminants." (MOFFA, 1996/1997)

**Community Support Agriculture:** "Community Support Agriculture (CSA) provides an economic and social alternative to conventional system of food production and

distribution. It (CSA) is built on shared responsibility and trust. Growers agree to raise fresh food for members. Members, in turn, purchase shares before the season begins and thereby provide the funds to pay the farmers salaries and to operate the CSA." (MOFFA, 1996/1997)

**Farming Practices:** Techniques and strategies that farmers use to operate their farms in a certain way toward certain goals and objectives.

**Nonpoint Water Pollution:** "Pollution of water that does not enter waterways from a specific "point" source, such as a pipe. Nonpoint pollutants are often carried from dispersed, diverse sources into water channels by rain-induced runoff. Runoff from streets , open pit and strip mines, and agricultural fields are prominent examples." (National Research Council, 1989)

**Pesticide:** A pesticide is a chemical substance that kills. "There are many types of pesticides: insecticides (kill insects and mites); fungicides (kill mildew, mold and other fungus); nematicides (kill warms); and rodenticides (kill rats, and other rodents)." (Hansen, 1992)

**Organic Farmers:** Refers to organic growers who are listed in "Eating Organically, A Guide to Michigan Food Producers and Related Businesses" (MOFFA, 1996/1997).

**Organic farming:** Organic farming "is a production system which avoids the use of synthetically compounded fertilizers, pesticides, growth regulators and livestock feed additives." (United States Department of Agriculture, 1980)

**Organic Growers of Michigan:** The Organic Growers of Michigan (OGM) is an organization of more than 200 organic farmers, gardeners and friends who are interested in organic growing practices and organically-raised food. Organized into eight Chapters around Michigan, OGM spans the state from Detroit to the Western Upper Peninsula. OGM has a certification system that assures the public that their crops are grown according to strict organic principles (MOFFA, 1996/1997).

**Organic Matter:** " Living biota present in the soil or the decaying or decayed remains of animals or plants. The living organic matter in the soil decomposes the dead organic matter. Organic matter in soil increases moisture and soluble nutrient, cation exchange, and water infiltration and can reduce soil erosion." (National Research Council, 1989)

**Sustainable Agriculture:** "Sustainable agriculture is both a philosophy and a system of farming. It is rooted in a set of values that reflects an awareness of both ecological and social realities and a commitment to respond appropriately to that awareness. It emphasizes design and management processes to conserve all resources and minimize waste and environmental damages, while maintaining or improving farm profitability." (MacRae, Hill, Henning, and Bently, 1990)

**The Michigan Organic Food and Farm Alliance (MOFFA):** MOFFA is a nonprofit organization dedicated to promoting the development of viable food systems that rely on organic methods of food production and that revitalize and sustain local communities in Michigan. MOFFA is working to create more public awareness about the nature of present corporately-controlled food supply and its environmental and social hazards (MOFFA, 1996/1997).

# Chapter 1

# LITERATURE REVIEW

## Introduction

The American farming system has geared itself into becoming an export-oriented agribusiness agriculture with the goal of maximizing productivity and profitability (Papendick, 1989). It has evolved into large and highly industrialized enterprises with limited crop rotation systems. Often the farms are managed like a manufacturing plant with goal of mass production of a uniform crop. This trend has been encouraged by a number of factors, such as the availability of fertile soil and an abundant water supply (Papendick and Elliot, 1984). In addition, it has been backed up by a high level of mechanization, improved crop varieties, and development of various synthetics to fertilize soil and control weeds, insects and diseases (Power and Follett, 1987). Today, the United States is one of the most productive nations in term of agriculture. A productive agriculture is an invaluable asset, but what is disturbing is the failure of the system to sustain itself. High yields do help maintain a profit edge, but unfortunately this often happens at the expense or depletion of a non-replaceable resource such as soil and/or ground water (Papendick and Elliot, 1984).

Soil erosion and high chemical use with present farming practices in the U.S. have caused serious environmental and human health problems. Surface and underground water contamination, and the presence of chemical residues in food products has become more than just an environmental issue. It has raised serious questions about potential

health hazards, the cost of monitoring water and food supplies, treatment, and liabilities (Hallberg, 1986).

**Water Pollution**

The U.S. Environmental Protection Agency (EPA) has identified agriculture as the largest source of non-point surface water pollution. Pesticides, and nitrates from fertilizers have been detected in groundwater in many agricultural regions (National Research Council, 1989). Non-point pollutants account for about 50 percent of all surface water pollution (Chesters and Schierow, 1985). Nitrate from agricultural sources has been detected in drinking water wells in levels above safety standards in many locations in several states. In California alone, 22 different chemical pesticides have been found in groundwater as a result of conventional agricultural practices (National Research Council, 1989). According to the U.S. Department of Agriculture, 350 to 400 million acres of land used for agriculture are estimated to account for more than 50 percent of suspended sediments deposited in surface water (U.S. Department of Agriculture, 1987a).

**Soil Erosion**

Soil erosion can cause both on-farm and off-farm damages. It has been estimated that as a result of wind and water erosion, the American crop lands lose 2.7 to 3.1 billion tons of top soil each year (National Research Council, 1986). According to the National

Resources Inventories of 1977, one-fourth of over 42 million acres of cropland experienced serious erosion, i.e., at rates well above the maximum tolerable rate that will permit sustainable crop production (Papendick and Elliot, 1984).

Common management practices of conventional farming such as the removal of terraces, shelter belts, and wind breaks to develop land, and intensive tillage to increase productivity, have accelerated wind and water erosion of the top soil. As Brown and Wolf (1994) put it: "Grave though the loss of topsoil may be, it is a quiet crisis, one that is not widely perceived. Often the very practices that cause excessive erosion in the long run, such as intensification of the cropping pattern and the plowing of marginal land, lead to short-term production gains, creating an illusion of progress and false security."

**Pesticide**

Intensive pesticide use has helped reduce devastating pest threat, especially in continuous monocultures which are highly susceptible to severe pest damage. Along with growing technology, pesticide use has made conventional agriculture both productive and to some extent profitable. But it has become a serious hazard to environmental well-being as a whole and human health in particular. In 1986, a National Cancer Institutes' study found that Kansas farm workers who were exposed to herbicides for more than 20 days per year had a 6 times higher risk of developing non-Hodgkins lymphomas (NHL) than non-farm workers (Hoar et al., 1986).

It is difficult to see the immediate health hazard of pesticides, but in the long run it will take its toll. As the name 'pesticides' implies, pesticides are designed to kill pests, plant and animal life deemed undesirable by human beings in agriculture or other contexts (Hansen et al., 1992). Nevertheless, they kill useful insects and natural pest predators along with the targeted pests indiscriminately. Among other beneficial insects, a large number of honeybees are killed as a result of pesticide sprays annually. The loss of honeybees, honey, and reduction in agricultural yields due to reduced pollination alone account for at least $135 million each year (Pimentel et al., 1980).

**Pesticides and Pest Resistance**

In 1978, it was estimated that in California 24 out of 25 top agricultural pests were identified as secondary pests (National Research Council, 1989). The pesticides that wipe out their predators create or aggravate their role or dominance as pests (Van den Bosch, 1980).

According to the National Research Council, more than 440 insect and mite species and over 70 fungus species have been identified to be resistant to some pesticides. Pest populations which are already resistant to one or more pesticides generally develop resistance to other chemicals more rapidly (National Research Council, 1986a). Similarly, Metcalf (1980) argues, chemical pesticides are expensive, and provide only temporary relief, as the explosive reproductive and evolutionary capacities of insects allow them to develop a mechanism of resistance to these and other control strategies. In response to

this phenomenon, larger and more frequent applications of the previously used pesticide becomes necessary. In some cases, more expensive, toxic, or ecologically hazardous pesticides have to be used to achieve control. This creates significant environmental and economic costs by initiating a cycle of shifting resistance and thus, increasing the use of pesticides (National Research Council, 1989).

**Alternative**

Growing concerns about the environmental, economic and social effects of chemical-dependent inorganic agriculture have led many farmers to reconsider their practices and look for alternative farming systems that make agriculture more sustainable. Many farmers are turning to farming practices that reduce input costs and environmental damage through more intensive management and efficient use of natural and biological resources (National Research Council,1989). Recently, there has been increasing interest in an alternative form of agriculture, not new, but not widely practiced, known as organic farming (Papendick, 1984).

**Organic Farming**

The term organic farming is used to refer to any agricultural system that is aimed at eliminating the use of non-renewable production input such as synthetically compounded fertilizers and pesticides. Further, it has also been recognized as a system which reduces the cost of conventional agriculture and leads farming to sustainability (USDA, 1980). In organic farming systems:

> ...seek to significantly reduce, or to avoid entirely, the use of synthetic fertilizers, pesticides, growth regulators, and other agricultural chemicals. The system relies instead on crop rotation, crop residues, animal manures, legumes, green manures, organic wastes, cultivation, and non-chemical pest control to maintain the organic matter and tilth of the soil, to supply nutrients, and to control insects, weeds, and dieases. (Crosson, 1989)

Hence, others see organic farming as a system of interactions, rather than as a set of independent farming operations. According to Harwood (1984), organic farming is a holistic efforts, with the attitudes and lifestyle of the farm family inseparable from the well-being of the other components of the farm system. The holistic nature of the farm implies interaction between components such as crops with crops, crops with animals, and soil condition and fertility with insect and disease incidence in the crops and livestock.

## Rationale for Transition to Organic Farming

The main concerns for shifting to organic farming is considered to be the rising environmental problems caused by conventional agriculture. Nonetheless, concern for the environment, without considering profit will make organic farming a failure, as concern for profit alone made conventional agriculture fail to sustain itself. If farmers commit financial suicide in quest of ecological concerns, their form of agriculture would be neither sustainable nor regenerative (Madden, 1987).

The goals of organic farming are to decrease harm to the environment and to human health, cut the costs of conventional agriculture, improve the soil quality, and yet

generate a profit. Farmers adopt organic farming for many different reasons. According to Macy and Hanafi (1987), there are four primary motivations for conventional farmers to convert to organic farming:

**Economics:**

- the shrink of conventional profit margins over the last decade as the input costs have increased and the price received for products decreased,
- generally, farmers tend to find ways to reduce input,
- higher profit potential of organic farming,
- to gain experience in low-input production, and reduce dependency on financially and politically expensive chemicals.

**Solutions to Current Farming Problems:**

- recognition of increasing problems of pesticide resistance, secondary pest outbreaks and the need to address problems of soil erosion, ground and surface water pollution, and diminishing air quality.

**Public Policy:**

- Growing public concerns about chemical and heavy metal residues in agricultural production may have made the farmers find it profitable to use consumer preferences to their advantages.

**Attitude Changes:**

- Farmers are also aware of the effect of pesticides on human health. By converting to organic farming, they create a healthier working environment for their families, employees and themselves.

## Barriers to Adoption of Organic Farming Method

### Yield Lost

Organic farming promises a sound and sustainable future as an alternative to inorganic farming. However, the economic impact of organic farming depends on many factors, such as climate, soil type, cropping history of the farm, the farmers' management skills and many other considerations. Crop rotation generally increases yields, decreases pest damage, and in the case of legumes, decreases fertilizer costs through nitrogen fixation, but the full benefits of crop rotation may take several years to materialize. Depending on the prices of farm equipment and input, adoption of rotation sometimes reduces the net farm income, especially during the initial years of transition (Dabbert and Madden, 1986). Weed control is one of the major problem in organic farming (Crosson, 1989). Fawcett (1983) notes that herbicides give better control of weeds in the crop row than cultivation. It permits higher seeding densities, therefore higher crop yields. Literature review by Crosson and Ekey (1988) indicated that alternative agriculture farmers have lower input cost. But it is not enough to offset the yield penalty. So the system generally is not as profitable as the conventional farming (James, 1983, Helmers et al, 1986; Dabbert and Madden, 1986). After a long time of operating conventionally, the use of certain kinds of pesticides and fertilizers may have disrupted natural predators and other biota. In many cases, reestablishing these populations and the balance among them require several years (Koepf et al, 1979).

**Management**

Elimination of inorganic fertilizers and pesticides calls for a new and different type of management. It requires the farmer to understand the complex relationships among crops, weeds, insects, diseases, and soil fertility well enough to suppress threats to the crops and encourage the factors that make the crops thrive (Crosson, 1989). It is plausible that the organic farmers must devote more time annually to management than do conventional farmers. Farmers' time is scarce, and acquiring the new, complex management requirements of alternative agriculture may be a barrier to its more widespread adoption (Fawcett, 1983).

**Government Policies**

One of the obstacles to the widespread adoption of organic farming appears to be the federal government commodity price support programs, as they are found to be designed in a way that discriminates against alternative systems.

> Many federal polices discourage adoption of alternative practices and systems by economically penalizing those who adopt rotation, apply certain soil conservation systems, or attempt to reduce pesticide applications. Federal programs often tolerate and sometimes encourage unrealistically high yield goals, inefficient fertilizer and pesticide use, and unsustainable use of land and water. Many farmers in these programs manage their farms to minimize present and future program benefits, sometimes at the expense of environmental quality. (National Research Council, 1989, P. 10 )

Eligibility requirement and incentives of federal farm support programs undermine the great potential for adoption of sustainable agriculture. By putting

constraints on the use of multi-year crop rotations and alternative non-program crops, these programs discourage farmers from reducing agrochemical use. And they also encourage more intensive production with chemicals by raising the "break even point" for chemical application (Fleming, 1987).

**Marketing**

One of the greatest problems faced by organic farmers is marketing. The single most powerful factor in promoting organic farming is creating markets for organic products. There is a set of interrelated problems in marketing organic food. Organic food is generally more expensive than conventional food-due to the costs for sustaining and improving a farm ecosystem. They are not conveniently available in many grocery stores, and often do not exist throughout the year in steady supply. Because of the lack of cosmetic treatment, some consumers object to the imperfect appearance of organic food. The majority of consumers are not clear about terms such as organic, unsprayed, pesticide-free, and the meaning of certification. On the other hand, some consumers do not trust that organic food is genuinely organic (Hansen et al, 1992).

**Prospective**

Despite all these barriers some farmers have already made the switch to organic farming system. Organic farming, if operated properly, can address most of the present agricultural problems (Papendick, 1984). It can break the pest cycle, conserve soil and water, reduce high input costs, protect the environment, and most importantly improve

food quality and human health. It not only has the "potential" to become as productive and profitable as inorganic agriculture, but also to sustain itself as a system, and guarantee safe food for everyone now and for generations to come.

> Well-managed alternative farming systems nearly use less synthetic chemical pesticides, fertilizers, and antibiotics per unit of production than comparable conventional farmers. Reduced use of these input lowers production costs and lessens agriculture's potential for adverse environmental and health effects without necessarily decreasing-and in some cases increasing-per acre crop yields and the productivity of livestock management systems. (National Research Council, 1989, P. 9)

Shifting to and promoting organic farming requires a change in attitude, thinking and behavior on the part of the scientists, farmers, consumers and policy makers. The success of some of organic farmers indicates that alternative farming practices hold promise for many other farmers and potential benefits for the nation. But how fast and how far this transformation will go depends on economic incentives, which are shaped by farm policies, market forces, research priorities, and the importance that society puts on achieving environmental goals (National Research Council, 1989).

# Chapter 2

# METHODOLOGY

## Study Method

Using a structured, pre-tested, and coded questionnaire, a telephone interview method was employed to carry out this study. In order to ensure that the variation between responses were related to actual differences between the respondents rather than variations in conducting interviews; the questions, their wording, and their sequence were fixed and identical for every respondent. Each interview began with an introduction including an explanation of the purpose of the interview. Only if the respondents were found interested, the interview would begin. Prior, and during the interview, the interviewer would try to adapt himself to the situation to establish a relationship of confidence and trust. Each interview was conducted in an informal and relaxed atmosphere. Questions were asked exactly as worded, and explanations were given if any misunderstanding occurred during the interview.

## Population, Sampling, and Sample Size

The population under this study consisted of organic farmers in Michigan who grew vegetables and/or crops. Participating farmers were randomly selected from "Eating Organically, a directory of, and a guide to Michigan's Organic Food Producers and Related Businesses" compiled and published by "The Michigan Organic Food and Farm Alliance" (MOFFA, 1996). The list consisted of 204 farmers who had been identified as

organic growers and voluntary agreed to be listed. But there could have been more organic farmers in Michigan who had not been listed in this directory. However this directory was the only, and the most recent source of information about Michigan organic farmers that could be attained at the time of study. The total population targeted for this study was 185 Michigan organic farmers who were listed as vegetables and/or field crops growers in the directory. A sample size of 10 farmers was randomly selected from the entire population for the purpose of pre-testing the questionnaire. The pre-test interviews were conducted to determine whether: (a) the farmers were responsive to the interview; and if (b) the questions which had been designed for the study were understandable and appropriate. The pre-test results indicated that the farmers were in fact responsive. It also helped make improvements in the questionnaire. The data gathered through pre-test study was not considered in the final analysis.

Through systematic random sampling, a sample size of 60 farmers was selected from the remaining 185 Michigan organic farmers in the list. All of the 60 farmers in the selected sample were contacted. But due to different reasons (such as moving, changing phone number, quitting organic farming, traveling at the time, having no time to be interviewed, and not being able to follow the questions), 14 farmers were excluded from the study. To substitute for these farmers, the names following their names in the list were selected for interview. In cases of unsuccessful interviews, the preceding farmers in the list were selected. This procedure was continued till a total of 60 farmers were interviewed.

**Instrumentation of the Study**

Based on the literature review and the preliminary interviews with organic farmers, a questionnaire was finalized (Appendix A), and pre-tested. Most of the questions were presented in forms of dichotomous, multiple choice or multiple answers. At the end of the questionnaire, four open-ended questions were designed to allow the respondents to describe the problems which were significant to them, to express their opinions, and to address their particular situations. This allowed the study to consider certain problems, and/or opinions that were not considered in the questionnaire. The entire interviews were conducted by the author of the study. The interviews were carried out between 10 AM and 9 PM each day, for two weeks until the survey was completed.

**Data Analysis and Interpretation**

The Statistical Package for Social Sciences (SPSS, version for Windows 95) was used to analyze the data. The confidence interval set for data analysis throughout this study was 95 percent, i.e., the alpha was set a-priori at .05. The data analysis of this study was mainly based on descriptive statistics including; frequency, percent, mean and standard deviation. Spearson correlation coefficient *r*, Eta, and contingency coefficient were also used to examine the relationship between variables. It is important to note that the findings of this study are exclusively applicable to the Michigan organic farmers who were listed in "Eating Organically" (MOFFA, 1996). It is not generalizable to the entire

organic farmers in Michigan, or organic farming in other states. However, it may give some insights to researchers who may wish to conduct similar studies elsewhere in the U.S.

# Chapter 3

# RESULTS AND DISCUSSION

## Organization of Results

This chapter presents the results obtained from the survey. The discussion is based on the sequence of study questions used in the survey, beginning with the first question of the first section through the last question of the last section of the questionnaire. There are seven sections in the questionnaire of which the first six sections are based on ranking, dichotomous, and multiple choices questions. These sections are titled, *General background*, *Input*, *Output*, *Sources of Information*, *Channels of Information*, and *Marketing*. The seventh section is composed of open-ended questions. The responses to the open-ended questions were also grouped for statistical analysis, using SPSS.

## General Background

**Type of Farm.** Based on major types of plant production, in a multiple-choices question, respondents were asked about the type of the farm they were operating. They were given three choices: Vegetables, Field crops, and Mixed (both vegetables, and field crops). It was found that 45% of the farms were vegetable farms. Almost one third of the farmers grew field crops, while about 22% had mixed operations comprising of vegetable and field crops (Figure 1).

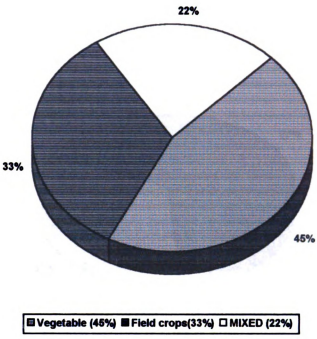


**Figure 1: Perceived major categories of organic farms**

**Full-Time/Part-Time.** Two-thirds of the respondents considered themselves full-time farmers, and one-third of them part-time (Figure 2).

**Duration Under Organic Management.** The findings of this study indicate that about 28% of the farms belonged to the respondents had been under organic farming for 5 to 10 years. About 22% of the these farms had been managed organically for 11 to 20 years, and about 18% of them had been farmed organically for more than 20 years. However, about 32% of them were reported to have been operated organically less than 5 years. The mean for the number of years under organic management for the farms studied was found to be 13.47 with standard deviation of 15.82 years (Table 1).

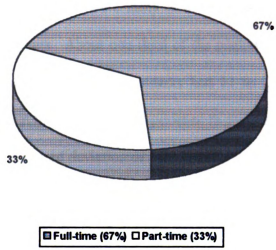


**Figure 2: Time spent on the farm**

**Table 1: Duration of the farms being operated organically**

| Years of Operation | Frequency (N = 60) | Percent |
|---|---|---|
| Less than 5 years | 19 | 31.7 |
| 5 to 10 Years | 17 | 28.3 |
| 11 to 20 Years | 13 | 21.7 |
| Over 21 years | 11 | 18.3 |
| Total | 60 | 100 |

Mean = 13.47
Standard Deviation = 15.82
Minimum = 2
Maximum = 100

**Respondents' experience in organic farming.** As indicated in table 2, almost one-fifth of the respondents had more than 20 years experience in organic farming. The majority of the respondents had an experience of less than 20 years in organic farming. It was found that about one-fifth of the respondents were fairly new to organic farming as they had an experience of less than 5 years. About one-third of the respondents had an experience of 5 to 10 years, and about 27% of the respondents had 11 to 20 years of experience in organic farming. The mean for the years of experience in organic farming of the Michigan farmers was 13.4 with a standard deviation of 11.21 (Table 2).

**Table 2: Respondents' years of experience in organic farming**

| Years of Experience | Frequency (N = 60) | Percent |
|---|---|---|
| Less than 5 years | 13 | 21.7 |
| 5 to 10 years | 20 | 33.3 |
| 11 to 20 years | 16 | 26.7 |
| Over 20 years | 11 | 18.3 |
| Total | 60 | 100 |

Mean = 13.4
Standard Deviation = 11.21
Minimum = 2
Maximum = 60

**Transfer.** Over half (51.7%) of respondents indicated that they had shitted to organic farming from inorganic farming. The rest of the farmers had always been organic growers (Table 3).

**Table 3: Respondents' farming background**

| Background | Frequency | Percent |
|---|---|---|
| Converted to organic farming | 31 | 51.7 |
| Never farmed in any other ways | 29 | 48.3 |
| Total | 60 | 100 |

**Farm Size.** It was found that the size of the organic farms studied range from 1 acre to 500 acres, except for one farm which was 1800 acres. It was notable that almost one-third of the respondents' farms were less than 10 acres, while one-third of them were more than 101 acres. About 8% of the respondents were operating farms of 10 to 20 acres, and about 28% farms of 21 to 100 acres. Average farm size was found to be 104 acres, with a standard deviation of 137.84 (Table 4). The 1800 acres farm was not included in the calculation of the mean and the standard deviation. However, it is interesting to note that this farm was reported to have been managed entirely organic. More importantly, the farmer who owned this farm estimated the productivity, and labor intensity of his farm the same as inorganic farms in the region. Further more, he believed that the profitability of his farm was even higher than most of the commercial farms that he knew. This can be considered a good example of a relatively large size organic farm being compatible to inorganic farms in terms of labor intensity, productivity, and profitability.

**Table 4: Acres under organic farming**

| Acres farmed | Frequency | Percent |
|---|---|---|
| Less than 10 acres | 19 | 31.7 |
| 10 to 20 acres | 5 | 8.3 |
| 21 to 100 acres | 17 | 28.3 |
| Over 101 acres | 19 | 31.7 |
| Total | 60 | 100 |

Mean = 104
Standard Deviation = 137.84
Minimum = 1
Maximum = 500

**Certification.** The majority of farmers (77%) who responded were certified by Organic Growers of Michigan (OGM), Organic Crop Improvement Association (MOFFA), or Michigan Organic Food and Farm Alliance (MOFFA). According to respondents, the advantages of being certified as opposed to not being certified included; fewer problems in finding marketing, higher prices for their products, and access to information on organic farming through newsletters, meetings, seminars, exhibitions, and/or demonstrations. The non-certified farmers, comprising 23% of the respondents, either believed that being certified was not helpful, or they were unqualified for certification (Figure 3). Among the respondents, one of the farmers certified by OCIA, reported that having his farm certified had helped him find a market for his soybeans in Japan-earning $21 a bushel as opposed to $7 a bushel for non-organic produce products. This suggests that there is a good market for organic products abroad. And those organic farmers who are looking for a better market may want to have their farms certified.

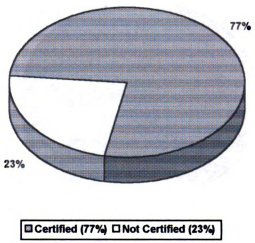


**Figure 3: Percent farmers certified as organic**

**Ownership.** The majority (95%) of respondents were found to operate their own farm. Only 5% of the farmers were leasing a farm (Figure 4).

**Experimentation.** It was found that most of the farmers (85%), were conducting experiments on their farms. The experiments included seed variatal trials and various farming practices (Figure 5).

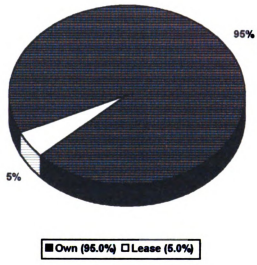


**Figure 4: Percent farm ownership**

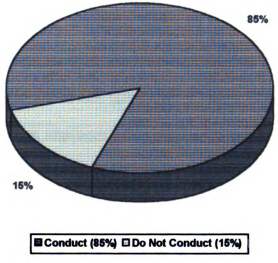


**Figure 5: Percent farmers conducting experiments on farm**

**Soil Erosion.** The use of cover crops was found to be the most popular method of soil erosion prevention. Crop rotation was also found to be a major method of soil erosion control. Other methods used for soil erosion control included contour cropping, use of wind breaks, light tillage, and residue management. The frequency and percentage of farmers using these methods of soil erosion control is shown in Table 5.

**Table 5: Major strategies used by farmers to prevent soil erosion**

| Strategies Used | Frequency | Percent |
|---|---|---|
| Cover Cropping | 52 | 86.7 |
| Crop Rotation | 44 | 73.3 |
| Contour Cropping | 10 | 16.7 |
| Wind Breaks | 42 | 70.0 |
| Light Tillage | 19 | 31.7 |
| Residue Management | 45 | 75.0 |

**Motivation for organic farming.** Concern for the environment and human health were found to be the most important motivating factors for farmers to opt for organic farming. Almost 97% of the farmers reported that they had taken up organic farming to prevent environmental degradation and to safe-guard human health. Likewise, a healthier working environment was seen as an important factor motivating the respondents. About 85% of the respondents believed that a healthier working environment was an important factor in their decision to choose farm organically. Economic factors such as reduction of capital costs, the higher potential profits of organic farming, and more efficient use of resources

were also found to be important motivating factors. The frequency of responses to various motivating factors are shown in Table 6.

**Table 6: Motivation for becoming an organic farmer**

| Motivation | Frequency | Percent |
|---|---|---|
| Concern for environment | 58 | 96.7 |
| Concern for human health | 58 | 96.7 |
| Concern for healthier working environment | 51 | 85.0 |
| Consumers' preference for organic produce products | 27 | 45.0 |
| Economic reasons—reducing input and capital costs | 25 | 41.7 |
| Higher profit potential of organic produce products | 21 | 35.0 |
| Efficient use of resources | 48 | 80.0 |
| Others | 13 | 21.7 |

**Labor.** Various studies have shown that organic farming is labor intensive (Carsson, in American Journal, Vol. 4, 1989). This was also found to be true in this study as almost 82% of the respondents agreed that organic farming was labor intensive. However, about 17% of the respondents found labor intensity to be the same as that for inorganic farming. Only about 2% reported that organic farming was less labor intensive than inorganic farming (Figure 6).

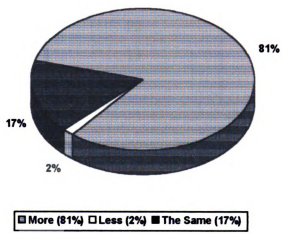


**Figure 6: Perceived labor intensity of organic farming**

## Inputs

**Access to inputs in the market.** The respondents were asked to rank the level of difficulty experienced in obtaining organic inputs in the market for their farm operations. A scale of 1 to 4 was used, where 1 = *Very difficult*, 2 = *Difficult*, 3 = *Not so difficult*, and 4 = *Not difficult at all*. Computation and analysis of the responses showed that the majority of farmers found it difficult to obtain organic inputs such as untreated seeds, compost, etc. A few (5%) farmers found it very difficult to obtain organic inputs. However, almost 22% of the respondents reported that it was not difficult at all to access organic inputs in the market (Table 7).

**Table 7: Perceived level of difficulty accessing organic farming inputs in the market**

| Level of Difficulty | Frequency | Percent |
|---|---|---|
| Very difficult | 3 | 5.0 |
| Difficult | 22 | 36.7 |
| Not so difficult | 22 | 36.7 |
| Not difficult at all | 13 | 21.6 |
| Total | 60 | 100 |

**Producing Inputs.** The majority (92%) of the respondents reported producing some organic inputs (mostly seeds, and compost) on their farm for their own use (Figure 7). It was inferred that this practice of producing organic inputs on-farm was done to prevent waste of farm by-products and to decrease reliance on off-farm organic inputs.

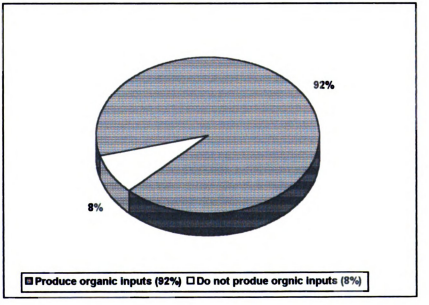


**Figure 7: Percent of farmers producing organic inputs**

**Using Organic/Inorganic Inputs.** Various organizations (OGM, OCIA, and MOFFA), associated with organic farming have developed regulations on preventing the use of inorganic inputs while farming organically. However, some of the respondents (6.7%) reported that they were not able to manage their farm entirely organic. The respondents described situations where they had no choice, but to use inorganic inputs. Such inputs included chemical fertilizers, and/or pesticides. Notwithstanding, the majority of the respondents (93.3%), claimed that they did not use inorganic inputs in managing their farm (Table 8).

**Table 8: Use of organic and/or inorganic input**

| Input | Frequency | Percent |
|---|---|---|
| Organic Input Only | 56 | 93.3 |
| Organic + Some inorganic Input | 4 | 6.7 |
| Total | 60 | 100 |

**Substitutes for Inorganic Inputs.** To operate a farm organically, substitutes have to be used for inorganic inputs such as chemical fertilizers and pesticides. The respondents were asked to evaluate the level of difficulty they had to face in finding such substitutes. On a scale of 1 to 4, where 1 = Very difficult, 2 = Difficult, 3 = Not so difficult, and 4 = Not difficult at all. As illustrated in Table 9, computation and analysis of these rank scores showed that majority (45%) of the farmers found it not difficult at all to substitute

chemical fertilizers for organic inputs. About 40% of the respondents found it not so difficult, 11.7% found it difficult, and 3.3% found it very difficult to substitute inorganic fertilizers. In the case of insecticides, 60% of the respondents did not find it difficult at all to substitute for inorganic insecticides. About 22% found it not so difficult, about 13% found it difficult, and 3.3% found it very difficult to manage without insecticides. About 3.3% of the respondents found it very difficult, and 11.7% found it not so difficult to substitute for fungicide. However, 80% of the respondents found it not difficult at all to manage their farm organically without the use of fungicides. About 12% of the respondents found it very difficult to manage their farm without herbicides, and 12% found it not so difficult. The majority (63.3%) of the respondents did not find substitute for herbicides to be a problem. The lack of nematicides and rodenticides did not seem to pose any difficulty in organic farming. Only 1 farmer found it difficult to manage his farm without nematicides, and rodenticide. The majority (88.3%), found it not difficult at all to manage their organic farm without the use of nematicides. Substitute for nomaticides did not seem to be a problem at all (Table 9).

**Table 9: perceived difficulty managing farms without the use of chemical inputs**

| Inorganic Inputs | Perceived Level of Difficulty | | | | Total | Mean (Std. Dev.) |
|---|---|---|---|---|---|---|
| | Very Difficult | Difficult | Not so Difficult | Not Difficult at All | | |
| | Frequency (%) | Frequency (%) | Frequency (%) | Frequency (%) | | |
| Fertilizers | 2 (3.3) | 7 (11.7) | 24 (40.0) | 27 (45.0) | 60 (100) | 3.27 (0.80) |
| Insecticides | 3 (5.0) | 8 (13.3) | 13 (21.7) | 36 (60.0) | 60 (100) | 3.37 (0.90) |
| Fungicides | 2 (3.3) | 3 (5.0) | 7 (11.7) | 48 (80.0) | 60 (100) | 3.68 (0.72) |
| Herbicides | 7 (11.7) | 8 (13.3) | 7 (11.7) | 38 (63.3) | 60 (100) | 3.27 (1.09) |
| Nematicides | 0 (0.0) | 1 (1.7) | 6 (10.0) | 53 (88.3) | 60 (100) | 3.87 (0.39) |
| Rodenticides | 0 (0.0) | 0 (0.0) | 1 (1.7) | 59 (98.3) | 60 (100) | 3.98 (0.13) |

## Outputs

**Productivity and Profitability.** The respondents were asked to compare organic farming to inorganic farming in terms of productivity and profitability (unite per acre). Four choices of responses were given to the farmers for comparison purposes: *the same, lower, higher, and do not know*. Analysis of the responses showed that almost 42% of the farmers believed that their farms were as productive as the inorganic farms in their region. About 18% of organic farmers saw no difference in profitability between organic farming and inorganic farming. However, 20% of the respondents felt that organic farming was less profitable than inorganic farming. About 30% of the respondents felt that organic farming was less productive than inorganic farming. About, 15% of the respondents found

organic farming to be more productive than inorganic farming. Similarly, the analysis showed that majority (45%), of respondents found organic farming to be more profitable than inorganic farming (Table 10). It is interesting to note that 45% of respondents perceived organic farming more profitable than inorganic farming, while only 15% perceived it more productive. The higher profitability of organic farming could be due to higher prices of organic products.

**Table 10: Perceived productivity/profitability of organic farming compared to inorganic**

| Particulars | The Same | Lower | Higher | Do not Know | Total |
|---|---|---|---|---|---|
| | Frequency (%) | Frequency (%) | Frequency (%) | Frequency (%) | |
| Productivity | 25 (41.7) | 18 (30.0) | 9 (15.0) | 8 (13.3) | 60 (100) |
| Profitability | 11 (18.3) | 12 (20.0) | 27 (45.0) | 10 (16.7) | 60 (100) |

**Sources of information**

Respondents were asked, in a series of dichotomized questions with the options of *"Yes"* and *"No"*, whether they had contacted various sources of information on organic farming. Sources of information focused in this study included the Michigan State University Extension (MSUE), the Michigan Organic Food and Farm Alliance (MOFFA), the Organic Crop Improvement Association (OCIA), Organic Growers of Michigan (OGM), and other organic farmers. Computation of the responses showed that 61.7% of the respondents had contacted MSUE, 48.3% had contacted MOFFA, 46.7% had

contacted OCIA, and 88.3% had contacted OGM and 98.3% had contacted others organic farmers (Figure 8).

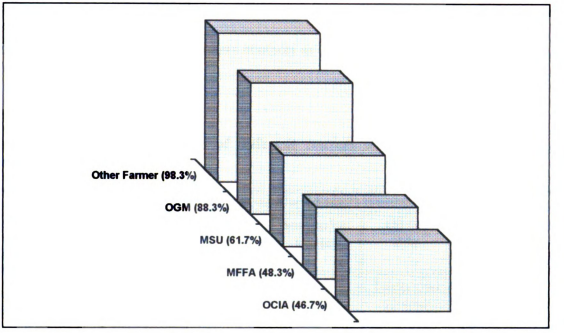


**Figure 8: Organizations approached by respondents for information on organic farming**

The respondents who had contacted these organizations were further asked to evaluate them in terms of their usefulness on a scale of 1 to 4, where 1 = *very useful*, 2 = *useful*, 3 = *somewhat useful*, and 4 = *of no use*. About 17% of the respondents who had contacted MSUE found it very useful, 10% found it useful, 15% found it somewhat useful, and 20% felt that it was of no use. Likewise, 18.33% found MOFFA to be very useful, 8.33% found it useful, 18.33% found it somewhat useful, and 6.9% found it of no use. Information from OCIA was found to be very useful by 26.66% of the respondents. About 13.33% found OCIA to be useful, 6.66% found it somewhat useful, and none of the respondents found OCIA to be of no use. Similarly, of the respondents who had

contacted OGM, 36.66% found it very useful, 15% useful, 31.66% somewhat useful, and 5% found it of no use. The analysis showed that contact with other organic farmers was the most useful source of information for the respondents. Almost 42% of the respondents who had contacted other organic farmers evaluated them as very useful. About 17% of the respondents ranked farmers-to-farmers contacts as useful, and 35.8% as somewhat useful (Table 11).

**Table 11: Perceived usefulness of different sources of information contacted by respondents**

| Sources of Information | Perceived Usefulness | | | | Total | Mean (SD) |
|---|---|---|---|---|---|---|
| | Very Useful | Useful | Somewhat Useful | Of No Use | | |
| | Freq. (%) | Freq. (%) | Freq. (%) | Freq. (%) | | |
| MSUE | 10 (17) | 6 (10) | 9 (15) | 12 (20) | 37 (62.0) | 2.62 (1.21) |
| MOFFA | 11 (18.3) | 5 (8.3) | 11 (18.3) | 2 (3.3) | 29 (48.3) | 2.14 (1.03) |
| OCIA | 16 (26.6) | 8 (13.3) | 4 (6.6) | 0 (0.0) | 28 (46.6) | 1.57 (0.74) |
| OGM | 22 (36.6) | 9 (15) | 19 (31.6) | 3 (5) | 53 (88.3) | 2.06 (1.01) |
| Farmer to Farmer | 50(83.3) | 7(11.6) | 2(3.3) | 0(0.0) | 59 (98.3) | 1.19 (0.47) |

**Channels of Information**

Respondents were asked if they had ever used electronic mail, written literature, meetings/seminars, exhibitions and demonstrations as channels of information Analysis of responses showed that 15% of the respondents had used electronic mail, 96.7% had used

written literature, 90% had used meetings and seminars, and 58.3% had used exhibitions and demonstrations as channels of information (Figure 9). It can be inferred from these responses that written literature, and meetings/seminars are the channels of information most widely used by the respondents.

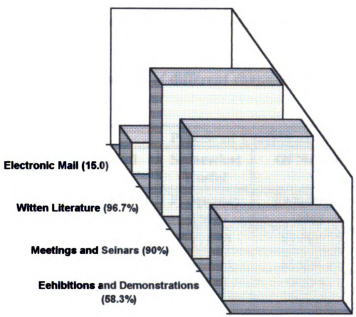


**Figure 9: Frequency of use of information media**

The respondents were further asked to evaluate channels of information on a scale of 1 to 3 in terms of their usefulness (1 = *very useful*, 2 = *somewhat useful*, 3 = *of no use*). About 1.7% of the respondents evaluated radio as very useful, 10% said radio was somewhat useful, and 88.3% found it of no use in terms of obtaining information on organic farming. Likewise, 1.7% of the respondents found television very useful, 13.3% found it somewhat useful, and 85% found it of no use. About 6.6% of the respondents believed that e-mail was very useful, and it 8.3% found it somewhat useful. Most of the

respondents (66.6%) found written literature very useful, 26.6% found it somewhat useful, and 3.3% found it of no use as a means of obtaining information on organic farming. Meetings, seminars, and workshops were found to be the second most useful channels of information. However, 33.3% found them somewhat useful, while 1.6% found them to be of no use. Exhibitions and demonstrations were found to be very useful by 43.3% of the respondents, while about 15% found it only somewhat useful (Table 12).

**Table 12: Perception on the usefulness of different channels of information**

| Media | Perceived Usefulness | | | |
|---|---|---|---|---|
| | Very Useful | Somewhat Useful | Of No Use | Total |
| | Frequency (%) | Frequency (%) | Frequency (%) | |
| Radio | 1 (1.7) | 6 (10.0) | 53 (88.3) | 60 (100) |
| Television | 1 (1.7) | 8 (13.3) | 51 (85.0) | 60 (100) |
| Electronic Mail | 4 (6.6) | 5 (8.3) | 0 (0.0) | 9 (8.3) |
| Written Literature | 40 (66.6) | 16 (26.6) | 2 (3.3) | 58 (96.5) |
| Meetings/Seminars Workshop | 33 (55) | 20 (33.3) | 1 (1.6) | 54 (91.6) |
| Exhibitions Demonstrations | 26 (43.3) | 9 (15) | 0 (0.0) | 35 (58.3) |

Although about 44% of the respondents evaluated e-mail as a very useful source of information, it was interesting to note that 85% of the respondents did not use e-mail as a channel of information. Further investigation on the use of e-mail was conducted by providing options such as *not familiar*, *do not have access to e-mail*, *both*, and *do not use*. Analysis of the responses showed that 35% of the respondents were neither familiar with

e-mail, nor had access to it. About 30% of the respondents said they did not use it, 28% said they did not have access to it, and 7.8% said they were not familiar with it (Figure 10).

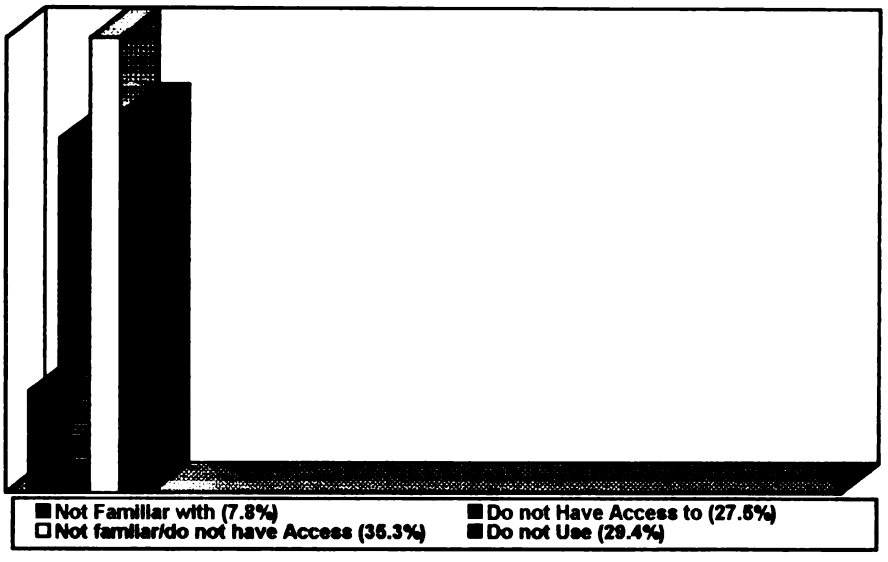


**Figure 10: Farmers' reasons for not using Electronic Mail as a channel of information**

## Marketing

Various studies have found the marketing of organic products to be an important factor in organic farming (Hansen, 1992). This survey included a query directed at evaluating the difficulties respondents faced in marketing their products. A scale of 1 to 3 was developed (where 1 = *very difficult*, 2 = *somewhat difficult*, and 3 = *not difficult at all*). Analysis of the responses showed that 9% of the respondents found it very difficult, and 38% of them found it somewhat difficult to find a market for their products. However, the majority (53%) of the respondents did not have any difficulty in marketing their products (Figure 11).

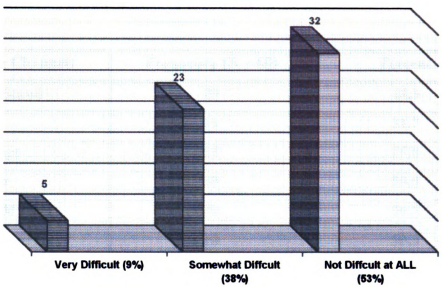


**Figure 11: Level of difficulty in marketing organic produce**

Respondents were further asked to identify the type of marketing channels they used to distribute their products. It was found that about half of the respondents marketed their products through wholesalers. About 48.3% used on-farm stands, 31.7% through retailers, and 30% through other channels such as neighbors, Community Supported Agriculture and friends. Similarly, about 25% used food co-operatives as marketing channel to distribute their products (Table 13).

**Table 13: Marketing channels used by organic farmers**

| Marketing Channels | Frequency (N = 60) | Percent |
|---|---|---|
| On-Farm Stand | 29 | 48.3 |
| Retailer | 19 | 31.7 |
| Food Co-ops | 15 | 25.0 |
| Wholesaler | 30 | 50.0 |
| Farmers' Market | 16 | 26.7 |
| Others | 18 | 30.0 |

The processes of cooling and culling generally helps in extending the shelf-life of organic products. The respondents were asked whether they used these methods. Majority (72%) of the respondents reported using these methods, while 28% reported that they did not use these practice (Figure 12).

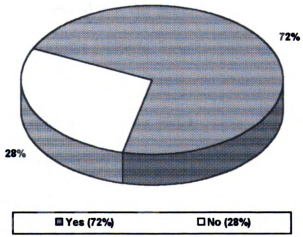


**Figure 12: Percent respondents using the process of culling and cooling**

The respondents were also asked to express their opinion on how Michigan State University Extension (MSUE) could improve its role in helping the organic growers. More than half of the respondents (55%) felt that MSUE should get more involved in organic farming. About 23% of the respondents expressed that MSUE agents should be trained in organic farming. Likewise, about 23% of respondents emphasized that MSUE should publish more materials related to organic farming, and educate farmers about the organic farming and its potential benefits to the environment and human health (Table 14).

**Table 14: Farmers' recommendations to MSUE**

| Recommendations | Frequency | Percent |
|---|---|---|
| Get Involved | 33 | 55.0 |
| Education | 14 | 23.3 |
| Publication | 14 | 23.3 |
| Others/no Comments | 9 | 15.0 |

It is generally believed that the prices of organic produce products are higher than the prices for non-organic products. Farmers were asked to give their rationale for the higher prices of organic products. The majority of the respondents (65%) believed that labor intensity is the chief cause of the higher prices of organic products (Table 15). Better quality (healthier) of organic products was quoted by about 32% of the respondents as another contributing factor for the higher prices. However, it is interesting to note that about 25% of the respondents mentioned the limited supply of organic products, especially

in winter, to be the cause of higher prices. About 10% of the respondents reported loss of production due to insect damage, disease, and crop rotation.

**Table 15: Perceived reasons for higher prices of organic products**

| Reason for Higher Prices of Organic Products | Frequency | Percent |
|---|---|---|
| Labor Intensity | 39 | 65.0 |
| Better Quality | 19 | 31.7 |
| Limited Supply | 15 | 25.0 |
| Loss of Production | 6 | 10.0 |

**Suggestions**

Finally, the respondents were asked to express their opinion on how organic farming could be promoted in Michigan. Findings showed that almost half of the respondents recommended more publicity about the benefits of organic farming to the environment and human health. The second most frequently recommended strategy was to increase the involvement of MSU in research on organic farming in Michigan. Several respondents were of the opinion that Michigan State University's recognition of "organic farming as an alternative to inorganic farming" would help in promoting organic farming in Michigan (Table 16).

**Table 16: Farmers' opinions on promoting organic farming in Michigan**

| Recommendation | Frequency | Percent |
|---|---|---|
| More research | 17 | 28.3 |
| Recognition of Organic Farming as a better Alternative | 5 | 8.3 |
| Publicity and Education | 48 | 80.0 |
| More Shelves for Organic Products at Grocery Stores | 8 | 13.3 |
| Lower the Prices of Organic Products | 5 | 8.3 |
| Others/no Comments | 11 | 18.3 |

## Test of Association

The responses to the questions in this section were analyzed using Spearman correlation coefficient to determine relationship between selected ranking /continuous variables, and ranking/categorical variables. Contingency coefficient was used to study the relationship between selected nominal level variables. And Eta correlation coefficient was used to examine relationships between selected continuous variables and categorical variables.

Spearman correlation coefficient r was used to measure relationships between respondents' years of experience in organic farming, and their perception on the level of difficulty in managing their farm without the use of chemical fertilizers, insecticides, fungicides, herbicides, nematicides, and rodenticides. The results did not indicate any significant relationship between these variables (Table 17).

The correlation between duration of the farms being under organic operation, and the respondents' perception on the level of difficulty managing their farm without the use of chemical fertilizers and pesticides were also determined using Spearman correlation coefficient, no significant correlation between these variables were found (Table 17). Likewise, the relationships between the type of farms and the respondents' perception on the level of difficulty they faced managing their farm without the use of chemical fertilizers and pesticides also showed no significant (Table17).

**Table 17: Correlation between the use of inorganic inputs and years of experience in organic farming, years under organic farming, type of farm, on-farm experiment and farm size**

| USE OF CHEMICAL | CORRELATION COEFFICIENT | | | | |
|---|---|---|---|---|---|
| | YEARS EXPERIENCE IN ORGANIC FARMING | YEARS UNDER ORGANIC FARMING | TYPE OF FARM | ON FARM EXPERI-MENT | FARM SIZE |
| Fertilizers | r = .074<br>p = .575 | r = .027<br>p = .842 | r = .193<br>p = .143 | r = .101<br>p = .446 | r = .103<br>p = .436 |
| Insecticides | r = .128<br>p = .331 | r = .056<br>p = .669 | r = .060<br>p = .647 | r = .149<br>p = .256 | r = .236<br>p = .069 |
| Fungicides | r = .119<br>p = .364 | r = -.085<br>p = .518 | r = .145<br>p = .271 | r = .209<br>p = .110 | r = .186<br>p = .154 |
| Herbicides | r = .229<br>p = .079 | r = .072<br>p = .587 | r = .127<br>p = .333 | r = .028<br>p = .831 | r = .195<br>p = .135 |
| Nematicides | r = .120<br>p = .361 | r = .153<br>p = .242 | r = .134<br>p = .309 | r = .010<br>p = .941 | r = .043<br>p = .742 |
| Rodenticides | r = .167<br>p = .203 | r = .163<br>p = .214 | r = .022<br>p = .867 | r = .055<br>p = .678 | r = .154<br>p = .240 |

Similarly, no significant correlation was found between conducting experiment on farm, and respondents' perception on the level of difficulty managing their farms without

the use of chemical fertilizers and pesticides (Table 17). No significant relationship between respondents' farm size, and their perception on the level of difficulty managing their farms without chemical fertilizers and pesticides were found in this study (Table 17).

The relationships between certified/non-certified respondents and their preferences of using different sources of information on organic farming was also not significant (Table 18).

**Table18: Correlation analysis between certified/non-certified respondents and their preferences of sources of information on organic farming**

| VARIABLE | VALUE | SIG. 2-TAILED |
|---|---|---|
| Certification/MSUE | r = .006 | p = .970 |
| Certification/MOFFA | r = -.065 | p = .738 |
| Certification/OCIA | r = .232 | p = .235 |
| Certification/OGM | r = .208 | p = .135 |
| Certification/Other Farmers | r = -.006 | p = .966 |

Further analysis of relationships between the respondents' years of experience, duration of their farms under organic management, their farm size, their certified/non-certified status, and their using the cooling/culling method and the level of difficulty facing them in finding a market for their products showed a weak, but positive relationship between respondents' certified/non-certified status and their level of difficulty finding a market for their products. No significant relationship was found between duration farms being under organic management and the other selected variables (Table19).

**Table19: Correlation between respondents' perception on the level of difficulty finding a market for their products and other selected variables**

| VARIABLE | VALUE | SIG. 2-TAILED |
|---|---|---|
| Years of experience and Marketing | r = .157 | p = .230 |
| Years under organic and Marketing | r = .246 | p = .058 |
| Farm size and Marketing | r = -.121 | p = .356 |
| Farm type and Marketing | r = .007 | p = .959 |
| Certification and Marketing | r = .254* | p = .050 |
| Cool-Culling and Marketing | r = .042 | p = .750 |

*. Correlation is significant at the 0.05 level.

It was also found that the relationship between respondents' being certified/non-certified and their preferences of different channels of information on organic farming was not significant (Table 20).

**Table20: Correlation analysis between respondents' being certified/non-certified, and their preferences of different channels of information on organic farming**

| VARIABLE | VALUE | SIG. 2-TAILED |
|---|---|---|
| Certification and Radio | r = .080 | p = .545 |
| Certification and Television | r = .123 | p = .349 |
| Certification and Electronic Mail | r = .535 | p = .111 |
| Certification and Journal | r = -.098 | p = .462 |
| Certification and Meetings/Seminars | r = .059 | p = .671 |
| Certification and Exhibition/demo. | r = .053 | p = .761 |

Statistical tests were conducted on the relationships between respondents' perception on the level of productivity, profitability, and labor intensity of their farms in comparison to that of the inorganic farms in their areas, and the following selected variables:

- duration of their farms being managed organically;
- their years of experience in organic farming;
- their farm size; and

their being certified/non-certified.

It can be seen in Table 21 that a weak but positive relationship existed between the respondents' farm size and the their perception on the level of profitability of their farms in comparison to inorganic farms in the area. this indicates that the bigger size farms were more profitable than the smaller size farms. On the contrary, a weak, but negative relationship was found between the respondents' farm size, and their perception on intensity level of their farms. This suggests larger farms were more labor intensive than the smaller farms. A moderate, but negative relation was found between respondents' farm size, and their perception on the level of productivity of their farm in comparison to inorganic farms in the area at alpha level of .01. No significant relationship was found between farm size and other selected variables (Table 21).

**Table 21: Correlation analysis between respondents' perception of the productivity, profitability, and labor intensity of their in comparison to inorganic farms in the region, and other selected variables**

| VARIABLE | VALUE | SIG. 2-TAILED |
|---|---|---|
| Years under organic and Productivity | r = -.071 | p = .617 |
| Years under organic and Profitability | r = .145 | p = .309 |
| Years under organic and Labor | r = -.213 | p = .102 |
| Years of experience and Productivity | r = -.110 | p = .440 |
| Years of experience and Profitability | r = -.210 | p = .140 |
| Years of experience and Labor | r = -.139 | p = .290 |
| Farm size and Productivity | r = -.368** | p = .007 |
| Farm size and Profitability | r = .306* | p = .029 |
| Farm size and Labor | r = -.255* | p = .050 |
| Certification and Productivity | r = -.094 | p = .507 |
| Certification and Profitability | r = -.126 | p = .379 |
| Certification and Labor | r = .049 | p = .709 |

**. Correlation is significant at the 0.01 level.

*. Correlation is significant at the 0.05 level.

Table 22 shows that no significant correlation was found between respondents using Organic/Inorganic inputs, and their years of experience in organic farming, their farms size, and duration of their farms under organic management.

**Table22: Correlation analysis between respondents' use of organic/inorganic inputs, and selected variables**

| VARIABLE | VALUE | SIG. 2-TAILED |
|---|---|---|
| Inputs used and Years under organic | r = .189 | p = .148 |
| Inputs used and Years of experience | r = .028 | p = .833 |
| Inputs used and Farm size | r = -.004 | p = .976 |

Likewise, it can be seen from table 23 that no significant correlation was found between the respondents' type of farm, and their perception on the productivity, profitability, and labor intensity of their farms in comparison to inorganic farms in the region.

**Table23: Correlation analysis between respondents' type of farm, and the selected variables**

| VARIABLE | VALUE | SIG. 2-TAILED |
|---|---|---|
| Type of Farm and Productivity | r = .013 | p = .929 |
| Type of Farm and Profitability | r = .269 | p = .056 |
| Type of Farm and Labor intensity | r = -.140 | p = .286 |

Contingency correlation coefficient test was used to determine the relationship between the nominal variables. This test was used to examine the relationship between respondents' having chosen organic farming, or shifting to organic growing, and their reasons for having done so. The test result showed a weak relationship between respondents' becoming organic growers, and consumer preferences for organic products.

It also indicated a weak relationship between respondents' chosen organic growing, and profit potential of organic farming. These results suggest that most of the respondents had chosen to farm organically for economic reasons. However, the result of the test did not show any relationship between respondents, having chosen organic farming and the other selected variables (Table 24). Similarly, tests conducted to study the relationship between the respondents' using organic/inorganic inputs, and their being certified/non-certified showed a weak relationship (Table 24). This indicates that certified organic farmers use less of inorganic inputs than non-certified organic growers.

**Table 24: Correlation between respondents' having chosen organic farming, or shifted to organic growing, and selected variables**

| VARIABLE | VALUE | SIG. 2-TAILED |
|---|---|---|
| Start/Convert and Environment | r = .189 | p = .137 |
| Start/Convert and Human Health | r = .189 | p = .137 |
| Start/Convert and Healthier working environment | r = .152 | p = .233 |
| Start/Convert and Consumer Preference | r = .262* | p = .035 |
| Start/Convert and Economic Reasons | r = .325** | p = .008 |
| Start/Convert and Profit Potential | r = .339* | p = .005 |
| Start/Convert and Efficient use of resources | r = .067 | p = .605 |
| Inputs used and Certification | r = .310* | p = .011 |

**. Correlation is significant at the .01 level.

*. Correlation is significant at the .05 level.

Eta coefficient correlation was used to examine the relationships between selected nominal variables, and interval variables. The result of these tests are summarized in

in Tables 25 and 26. The analysis indicated a weak relationship between the respondents' type of farms, and farm sizes (Table 25). The result of Eta correlation coefficient showed a very weak relationship between the respondents' being full-time/part-time organic growers, and their farm size (Table 30). The test result also suggested a very weak relationship between respondents' using organic/non-organic inputs, and the size of their farms (Table 25).

**Table 25: Correlation between farm size and type of farm, full/part-time nature, and access to organic/inorganic inputs**

| VARIABLE | VALUE | | |
|---|---|---|---|
| | TYPE OF FARM | FULL/PART-TIME | ORGANIC/INORGANIC INPUTS |
| Farm Size | .228 | .102 | .033 |

Furthermore, the Eta correlation coefficient showed a weak relationship between the respondents using organic/inorganic inputs and years farms being under organic management (Table 26). Generally, farms which had been operated organically longer, tended to be managed using less of inorganic inputs. Similarly, Table 26 shows a weak relationship between the respondents use of organic/inorganic inputs and years of experience in organic farming. This means that as the farmers' years of experience in organic farming increased, their use of inorganic inputs decreased. Likewise, it was also found that respondents conducting experiment on their farms used less of inorganic and more of organic inputs (Table 26).

**Table 26: Correlation between respondents use of organic/inorganic inputs and years under organic management, years of experience, and conducting on farm experiment**

| VARIABLE | VALUE | | |
|---|---|---|---|
| | **Years under organic management** | **Years of experience** | **Conducting experiment** |
| Organic/inorganic inputs | .234 | .005 | .112 |

# Chapter 4

# SUMMARY AND CONCLUSIONS/RECOMMENDATIONS

## Summary

The primary purpose of this research was to study organic farming in Michigan from the Michigan organic farmers perspectives. The specific research objectives of the study were to:

1. Provide documentation of the present situation of organic farming in Michigan,
2. Identify and evaluate major challenges faced by organic farmers in Michigan, and
3. Suggest actions that would promote organic farming in Michigan.

The population under this study were those organic farmers who were listed in "Eating Organically, a directory of, and guide to Michigan organic food producers and related business", compiled and published by Michigan Organic Food and Farm Alliances (MOFFA, 1996). There could have been other organic farmers who were not listed in this directory, but were part of the population of Michigan organic growers. Due to this limitation, no valid generalization could be made to other organic farmers in Michigan who were not included in this directory.

The data collection for this study was collected by telephone interview survey method. A systematic random sampling was used to select 60 farmers from a population of 185. The survey instrument of the study composed of 36 closed and 4 open-ended questions. Because of the descriptive nature of the study, descriptive statistics was used for data analysis, included; frequencies, percentages, means, and standard deviations.

Correlation analysis of Spearman correlation coefficient, contingency coefficient, and Eta correlation were used to examine relationships between selected variable.

Most of the respondent were either vegetable, or field crop farmers. Majority of the respondents considered themselves full-time organic growers. Data analysis showed that majority of the respondents conduct experiment on their farms. Further data analysis indicated that respondents who conduct experiment on their farms use less of inorganic and more of organic inputs. On an average farms studied had been operated organically for about 14 years. Data analysis showed a weak, but positive relationship between duration of farms being under organic operation, and their being managed using less of inorganic inputs.

Almost one-fifth of the respondents had more than 20 years of experience in organic farming. The majority of the respondents had an experience of less than 20 years in organic farming. It was found that about one-fifth of the respondents were fairly new to organic farming as they had an experience of less than 5 years. About one-third of the respondents had an experience of 5 to 10 years, and about 27% of the respondents had 11 to 20 years of experience in organic farming. Analysis of data for this study showed a weak relationship between the respondents use of organic/inorganic inputs and years of experience in organic farming. This means that as the farmers' years of experience in organic farming increases, they tend to use less inorganic inputs.

Majority of respondents were certified growers. The certified respondents believed that it was to their advantages to be certified. It would help them obtain higher prices for their products, and better access to information on organic farming through the

certifying agents. A positive relationship was seen between respondents' being certified/non-certified, and finding marketing for their organic products. Certification seems to have an impact on farmers' use of both organic and inorganic inputs. A positive correlation was found between respondents' being certified/non-certified and their use of organic/ inorganic inputs.

The size of the organic farms studied ranged from 1 acre to 500 acres, except for one farm which was 1800 acres. It was notable that almost one-third of the respondents' farms were less than 10 acres in size. Data analysis showed a weak but positive relationship between the respondents' farm size and their perception on the level of profitability of their farms in comparison to inorganic farms in the area. This means that bigger size farms tend to be more profitable. But the smaller size farms seem to be more productive than farms of bigger size, as a moderate, but negative relation was found between respondents' farm size, and their perception on the level of productivity of their farm in comparison to inorganic farms in the area at alpha level of .01. The larger size farms tend to be more labor intensive than the smaller size farms, as a weak, but negative relationship was found between the respondents' farm size, and their perception on labor intensity level of their farms in comparison to inorganic farms in the region.

Majority of the respondents were certified organic growers. The advantages of being certified as opposed to not being certified included; fewer problems in finding marketing, receiving higher prices for the certified products, and access to information on organic farming through certifying organizations. The non-certified farmers either believed that being certified was not helpful, or they were unqualified for certification. However,

data analysis showed a weak, but positive relationship between respondents' certified/non-certified status and their level of difficulty finding a market for their products. This indicates that being a certified organic grower makes a difference in finding a better market.

None of the respondents found soil erosion to be a problem. The use of cover crops was found to be the most popular method of soil erosion prevention. Crop rotation was also found to be a major method of soil erosion control used by the respondents. Other methods used for soil erosion control included contour cropping, use of wind breaks, light tillage, and residue management.

Concern for the environment and human health were found to be the most important motivating factors for farmers to opt for organic farming. Likewise, a healthier working environment was seen as an important factor motivating the respondents. Economic factors such as reduction of input and/or capital costs, the higher potential profits of organic farming, consumer preference for organic products, and more efficient use of resources were also found to be important motivating factors. The test result showed a weak relationship between respondents' becoming organic growers, and consumer preferences for organic products. It also indicated a weak, but positive relationship between respondents' chosen organic growing, and profit potential of organic farming.

Most of the respondents reported producing some organic inputs (mostly seeds, and compost) on their farm for their own use. It was inferred that this practice of producing organic inputs on-farm was done to prevent waste of farm by-products and to

decrease reliance on off-farm organic inputs. Substituting chemical inputs such as fertilizers, insecticides, fungicides, and herbicides was not found to be a major problem faced by the farmers.

Majority of the farmers believed that their farms were as productive as the inorganic farms in their region. About 18% of organic farmers saw no difference in profitability between organic farming and inorganic farming. However, 20% of the respondents felt that organic farming was less profitable than inorganic farming. About 30% of the respondents felt that organic farming was less productive than inorganic farming. About, 15% of the respondents found organic farming to be more productive than inorganic farming. Similarly, the analysis showed that majority (45%) of respondents found organic farming to be more profitable than inorganic farming. The higher profitability of organic farming reasoned to be due to higher prices of organic products.

Contact with other organic farmers was found to be the most useful source of information on organic farming. Written literature was a channel of information most widely used by the respondents. Meetings, seminars, and workshops were found to be the second most useful channel of information. Third most useful channels of information on organic farming found to be exhibitions and demonstrations on organic farming. Majority of the respondents were neither familiar with e-mail, nor had access to it.

Majority of the respondents did not have any difficulty in marketing their products. About half of the respondents marketed their products through wholesalers and on-farm stands. Retailers, and, neighbors, friends, Community Supported Agriculture and

food co-operatives were the second most frequently used marketing channel. Respondents who were engaged in CSA did not express any difficulty marketing their products.

It is generally believed that the prices of organic produce products are higher than the prices for non-organic products. Labor intensity of organic farming was found to be a major problem faced by the respondents. It was also considered to be the chief cause of the higher prices of organic products. Better quality (healthier) of organic products was quoted by about one third of the respondents as another contributing factor for the higher prices. However, it is interesting to note that about 25% of the respondents mentioned the limited supply of organic products, especially in winter, to be the cause of higher prices. Several of the respondents reported loss of production due to insect damage, disease, and crop rotation.

More than half of the respondents felt that MSUE should get more involved in organic farming. About one third of the respondents were of the opinion that MSUE agents should get more training in organic farming. It was recommended that more publicity about the benefits of organic farming to environment and human health; and Michigan State University's recognition of "organic farming as an alternative to inorganic agriculture" would help in promoting organic farming in Michigan.

**Conclusions/Recommendations**

This study suggests that organic farming is a new experience in Michigan. Based on this finding, it can be concluded that as organic growers become more familiar with

organic farming, they may experience less difficulty managing their farms without the use of chemical inputs, spend less labor hours on their farms, while making a better profit.

Scarcity of organic products in Michigan can be regarded as a determining factor for the reluctance of non-certified organic farmers to become certified, as the consumers would buy non-certified organic products in absence of certified ones. However, if organic products become abundant in Michigan, certification will definitely play a determining role in the food market. Given the present situation, the need for certification may not be felt gravely in Michigan, but it seems to have an important role in enabling the certified organic growers take advantage of the international organic food market.

One of the major problem faced by majority of respondents was the labor intensity of organic farming. It is important to note that those who regarded labor intensity of organic farming the same as, or lower than that of inorganic farming, also believed that the labor intensity of organic farming is a matter of management/timing. A good management/ timing, they argued does not give weeds a chance to grow out of control. The labor intensity of organic farming can also be looked at positively. It could be argued that many jobs that disappeared as a result of commercial farming may reemerge through practicing organic farming. However, in the absence of labor abundance in agricultural sector, it could be regarded as a major problem.

In the present situation where organic products are scarce, there is no need for long term shelving of these products. Unfortunately there is no effective and efficient ways of expanding the shelf-life of fresh vegetables organically. If organic farming is to replace inorganic agriculture in Michigan, and if organic products are going to be produced in

large quantity, this would be a major problem. Exploring the strategies of expanding the shelf-life of organic products organically would increase the possibility of allocating more shelves to organic products in grocery stores all over Michigan, all year round.

As data analysis for this study indicates, the high prices of organic products play both a positive and a negative role in promoting organic farming in Michigan. On one hand, it encourages the commercial farmers to shift to organic farming. On the other hand, the prices are too high for the majority of consumers to afford. But in comparison to the prices that consumers may inevitably pay to overcome the problems caused by inorganic farming to the environment and human health, the higher prices for organic products seem to be quite reasonable.

Majority of respondents reported that they were not familiar with, or did not have access to electronic mail. Electronic mail can be a useful channel of information on organic farming as data analysis showed it was considered useful by those respondents who were familiar and had access to it. Furthermore, in a situation that farmers-to-farmers is one of the most useful source of information on organic farming, electronic mail may make this source of information even more useful.

Finally, based on the respondents' opinions it can be concluded that organic farming may become a major farming system in Michigan if the following actions are considered:

1. Michigan State University Extension (MSUE) agents should become more knowledgeable about organic farming. They know far more about chemical farming than do they about natural growing. MSUE agents should spend more time with

organic farmers on seasonal basis to understand what organic farmers do season to season to manage their farm organically. This would help them to have a better picture of organic farming.

2. There is not much recognition of organic farming on the part of Michigan State University (MSU). MSU should accept organic farming as a healthier way of farming, and get more involved in it through more research, studies, and publications.
3. Organic farming is not covered by the media as an issue. Media should play a more active role in introducing organic farming as an alternative way of farming, and healthier way of producing food to the public.
4. One of the most compelling problem in organic farming is managing it without the use of chemical inputs. More research is needed to be done on how to substitute for chemical fertilizers and pesticides.
5. Consumers have to be more educated about the benefits of organic farming to both the environment, and human health. Public awareness about the health benefits of organic farming would increase demand for organic products. Increasing demand for organic products would be one way of promoting organic farming in Michigan.

# APPENDIX

**APPENDIX**

***Sample #_____***

**Questionnaire**

My name is Ali Naemi. I am a graduate student at Michigan State University. I am currently studying towards my Masters degree in Agriculture and Extension Education. I am calling to ask you few questions related to my thesis research. I have selected organic farming in Michigan as a focus of my research. I am trying to identify the constraints that organic growers face in Michigan. The outcome of my research will help policy makers develop programs to promote organic farming in Michigan. May I take about 15 minutes of your time and ask you a few questions.

Before we begin, let me assure you that any information you provide me will be kept confidential and used for research purpose only. This interview is completely voluntary and if you do not want to answer any question, we will skip that particular question.

# General Information:

May I first verify your type of farm, farm name and address please?

**1. Based on major plant production, what type of farm do operate?**

_____(1a) Vegetables
_____(1b) Field crops
_____(1c) Mixed (vegetables, crops, fruits, Beans, etc.)
_____ Others

**2. Are you a full-time organic farmer, or just a part-time?**

_____Full-time _____Part-time

**3. To the best of your knowledge, how many years has your farm been operated organically?**
_____Years

**4. How many years of experience do you have in organic farming?**
_____Years

**5. Have you converted to organic farming, or you have never farmed in any other ways?**

_____Converted

_____Never farmed any other ways

**6. How many acres do you farm organically?**

_____Acres

**7. Are you a certified organic grower?**

_____Yes (please specify the advantages of being a certified organic grower)_____
_____

_____No

**8. Do you own or lease the farm you are currently operating?**

_____Own

_____Lease

**9. Do you conduct any experiments on your farm?**

_____Yes

_____No

**10. There are a number of strategies that could be applied to prevent soil erosion due to wind and/or water run-off. What strategies do you use to prevent soil erosion in your farm?**

_____***(10a)*** Cover cropping management.
_____***(10b)*** Crop rotation management.
_____***(10c)*** Contour Cropping.
_____***(10d)*** Wind breaks.
_____***(10e)*** Light tillage.
_____***(10f)*** Residue management.
_____ Other strategies (Please specify)
_____

**11. Now I would like to ask you one question about your motivation toward organic farming. Why you have preferred organic farming over non-organic farming? (Check out the following options)**

_____ ***(11a)*** Because of the concern for ***environment***.
_____ ***(11b)*** Because of my concern for ***human health***.
_____ ***(11c)*** Because of my concern for ***healthier working environment*** on farm.
_____ ***(11d)*** Because of ***consumer preference for organic products***.
_____ ***(11e)*** Because of ***economic*** reasons (reducing my inputs and capital costs).
_____ ***(11f)*** Because of ***higher profit potential of organic farming***.
_____ ***(11g)*** Because of ***making efficient use of available land, labor, and resources***.
_____ Because of other reasons? Please Specify.

_____

# Inputs:

**12. In your opinion, In comparison to conventional farming, organic farming is "more labor intensive", "less labor intensive" or "about the same"?**

_____More _____Less _____About the same

**13. Have you found accessing to organic farming inputs such as untreated seeds, manure, etc., "very difficult", difficult", "not difficult", or not difficult at all" ?**

| Very difficult | Difficult | Not difficult | Not difficult at all |
|---|---|---|---|
| _____ | _____ | _____ | _____ |

**14. Do you produce any organic inputs such as seeds and manure at your farm?**

_____Yes, What kind of organic inputs do you produce?_____

_____No

**15. Do you operate your farm using organic inputs only, or you do also use non-organic inputs such as chemical fertilizers, treated seeds, and/or pesticides from time to time?**

_____Organic inputs only

_____Use also non-organic inputs from time to time, (please specify what kind of non-organic inputs)_____

**To operate your farm organically, you have to manage it without the use of chemical fertilizers and pesticides.**

**16. How difficult have you found managing your farm without the use of chemical fertilizers, have you found it: "very difficult", "difficult", "not difficult", or "not difficult at all"?**

| Very Difficult | Difficult | Not Difficult | Not Difficult at All |
|---|---|---|---|
| _____ | _____ | _____ | _____ |

**17. How difficult have you found managing your farm without the use of chemical insecticides, have you found it: "very difficult", "difficult", "not difficult", or "not difficult at all"?**

| Very Difficult | Difficult | Not Difficult | Not Difficult at All |
|---|---|---|---|
| _____ | _____ | _____ | _____ |

**18. How difficult have you found managing your farm without the use of chemical fungicides, have you found it: "very difficult", "difficult", "not difficult", or "not difficult at all"?**

| Very Difficult | Difficult | Not Difficult | Not Difficult at All |
|---|---|---|---|
| _____ | _____ | _____ | _____ |

**19. How difficult have you found managing your farm without the use of chemical herbicides, have you found it: "very difficult", "difficult", "not difficult", or "not difficult at all"?**

| Very Difficult | Difficult | Not Difficult | Not Difficult at All |
|---|---|---|---|
| _____ | _____ | _____ | _____ |

**20. How difficult have you found managing your farm without the use of chemical nematicides, have you found it: "very difficult", "difficult", "not difficult", or "not difficult at all"?**

| Very Difficult | Difficult | Not Difficult | Not Difficult at All |
|---|---|---|---|
| _____ | _____ | _____ | _____ |

**21. How difficult have you found managing your farm without the use of chemical rodenticides, have you found it: "very difficult", "difficult", "not difficult", or "not difficult at all"?**

| Very Difficult | Difficult | Not Difficult | Not Difficult at All |
|---|---|---|---|
| _____ | _____ | _____ | _____ |

# Outputs:

**22. In comparison to conventional farms, in your area, would you rate the productivity of your farm "higher", "lower", "at the same level", or you "do not know"?**

_____The same _____Lower _____Higher _____Do not Know

**23. In comparison to non-organic farms in your area do you rate the profitability of your farm "lower, "higher", "at the same level", or you "do not know"?**

_____The same _____Lower _____Higher _____Do not Know

# Sources of Information:

**24a. Have you ever happened to contact Michigan State University Extension Services for information on organic farming?**

_____Yes

_____No

If "NO", go to question # 25a.

**24b. On the scale of one to four, one for "very useful", tow for "somewhat useful", three for "of no use", and four for "of no use", how do you rate the usefulness of Michigan State University Extension Services as a source of information?**

_____Very Useful _____Useful _____Somewhat Useful _____Of no use

**25a. Have you ever happened to contact Michigan Organic Food and Farm Alliance (MOFFA) for information on organic farming?**

_____Yes

_____No

If "NO", go to question # 26a.

**25b. On the scale of one to three, one for "very useful", tow for "somewhat useful", three for "of no use", and four for "of no use", how do you rate the usefulness of Michigan Food and Farm Alliance, as a source of information?**

_____Very Useful _____Useful _____Somewhat Useful _____Of no use

**26a. Have you ever happened to contact Organic Crop Improvement Association for information on organic farming?**

_____Yes

_____No

If "NO", go to question # 27a.

**26b. On the scale of one to three, one for "very useful", tow for "somewhat useful", three for "of no use", and four for "of no use", how do you rate the usefulness of Organic Crop Improvement Association, as a source of information?**

_____Very Useful _____Useful _____Somewhat Useful _____Of no use

**27a. Have you ever happened to contact Organic Growers of Michigan for information on organic farming?**

_____Yes

_____No

If "NO", go to question # 28a.

**27b. On the scale of one to three, one for "very useful", tow for "somewhat useful", three for "of no use", and four for "of no use" how do you rate the usefulness of Organic Growers of Michigan, as a source of information?**

_____Very Useful _____Useful _____Somewhat Useful _____Of no use

**28a. Have you ever happened to contact other organic farmers for information on organic farming?**

_____Yes

_____No

If "NO", go to question # 29a.

**28b. On the scale of one to three, one for "very useful", tow for "somewhat useful", three for "of no use", and four for "Of no use", how do you rate the usefulness of other organic farmers as a source of information?**

_____Very Useful _____Useful _____Somewhat Useful _____Of no use

# Channels of Information:

**29. On the scale of one to three, one for "very useful", tow for "somewhat useful", and three for "of no use", how do you rate the usefulness of Radio as a channel of information, regarding organic farming?**

_____Very Useful _____Somewhat Useful _____Of No Use

**30. On the scale of one to three, one for "very useful", tow for "somewhat useful", and three for "of no use", how do you rate the usefulness of Television as a channel of information, regarding organic farming?**

_____Very Useful _____Somewhat Useful _____Of No Use

**31a. Do you receive information on organic farming through Electronic Mail, such as WWW, DTN, or Farm Datya Services?**

_____Yes

_____No

If the answer is "yes", go to question # 32a.

**31b. You said, you do not use Electronic Mail as a channel of information, is it because you are not familiar with using computer, or you do not have access to it, or both?**

_____Not familiar _____Do not have access _____Both

**31c. On the scale of one to three, one for "very useful", tow for "somewhat useful", and three for "of no use", how do you rate the usefulness of Electronic Mail, such as WWW, DTN, or Farm Datya Services as a channel of information?**

_____Very Useful _____Somewhat Useful _____Of No Use

**32a. Do you receive information on organic farming through journals, magazines, bulletins, and/or newspapers?**

_____Yes

_____No

If "No", go to question # 33a.

**32b. On the scale of one to three, one for "very useful", tow for "somewhat useful", and three for "of no use", how do you rate the usefulness of journals, magazines, bulletins, and/or newspapers as a channel of information?**

_____Very Useful _____Somewhat Useful _____Of No Use

**33a. Have you happened to attend any meetings, seminars, and/or workshops on organic farming?**

_____Yes

_____No

If "No", go to question # 34a.

**33b. On the scale of one to three, one for "very useful", tow for "somewhat useful", and three for "of no use", how do you rate the usefulness of meetings, seminars, and/or workshops as a channel of information?**

_____Very Useful _____Somewhat Useful _____Of No Use

**34a. Have you happened to attend any exhibitions and/or demonstrations on organic farming?**

_____Yes

_____No

If "No", go to question # 35.

**34b. On the scale of one to three, one for "very useful", tow for "somewhat useful", and three for "of no use", how do you rate the usefulness of exhibitions, and/or demonstrations as a channel of information?**

_____Very Useful _____Somewhat Useful _____Of No Use

# Marketing:

**35. Do you find marketing for your products, "very difficult", "somewhat difficult", or "not difficult at all"?**

_____Very Difficult _____Somewhat Difficult _____Not Difficult At All

**36. Through what kind of market do you distribute your organic products?**

_____***(36a)*** On-farm stand
_____***(36b)*** Retailer
_____***(36c)*** Food Co-ops
_____***(36d)*** Wholesaler
_____***(36e)*** Farmers' market
_____***(36f)*** Other (Please explain)

_____

**37. Do you use culling (selection) and/or cooling methods to extend the shelf life of your organic products?**

_____Yes

_____No

# Prospective:

**38. In your opinion, how can Michigan State University Extension improve its role in helping organic growers in Michigan?**

**39. The prices for organic products tend to be higher than prices for non-organic products? In your opinion, what is responsible for higher prices of organic products?**

**40. In your opinion, what can be done to promote organic farming in Michigan?**

**41. Would you like to make any comments?**

Thank you for your time, cooperation and input. If you like, I would be very happy to send you a summary of my research outcome.

_____Yes

_____No

***Thank you***

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