

**ASSESSMENT OF DEMAND FOR
ORGANICALLY GROWN
VEGETABLES IN WINNIPEG.**

by

C. Darrel Harmon

A Practicum Submitted
In Partial Fulfillment of the
Requirements for the Degree
Master of Natural Resources Management

Natural Resources Institute
The University of Manitoba
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A practicum submitted to the Faculty of Graduate Studies of the University of Manitoba in partial fulfillment of the requirements of the degree of Master of Natural Resources Management.

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ABSTRACT

Organic farming is a method of raising crops and animals which avoids the use of synthetic fertilizers and pesticides, relying on natural inputs such as manure to raise a healthy and chemical free crop. This type of agriculture has become more popular in recent years due to both farmer and consumer concerns over personal health and the carcinogenic potential of many chemical residues in foods.

Recognizing the growth of this trend in other commercial markets, this research investigated consumer demand and industry acceptance and willingness to supply, purchase and use organically grown vegetables. Organic agriculture was defined and certification programs throughout the world were discussed. The main benefits of organic production were found to be reduced soil erosion, reduced water pollution, and lower use of chemicals and resulting lessened chemical exposure to the environment, plants, animals and people. The reasons organic agriculture is becoming more popular, from nutrition to health concerns and philosophy, were also discussed. The trend towards increasing supplies of organically grown vegetables and other food crops being available, from producers through wholesalers, retailers and restaurants, to consumers, was examined and quantified.

A statistically significant sample of Winnipeg consumers were surveyed to determine their willingness to purchase and pay more for organically grown vegetables. Food industry representatives from farmers, wholesalers and retailers to leading chefs were interviewed and found well prepared to purchase, use and promote organically grown vegetables. Answers are needed on the regularity and price of organically grown vegetables which were beyond the scope of this research. Demand was found to exist in all sectors examined, but supply was extremely limited. Market testing by large supermarkets was recommended to open a potentially beneficial and profitable market. Also recommended was recognition of this trend by federal and provincial departments of agriculture and agricultural academics, and the provision of information to conventional farmers who expressed interest in the methods of organic agriculture.

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Chapter I

INTRODUCTION

1.1 BACKGROUND

In recent years, the food industry has begun to recognize the public's desire to purchase and consume vegetables grown and marketed without the use of chemicals and preservatives. In many parts of North America, restaurants and grocery stores are beginning to feature these 'organically grown' vegetables.

Organic agriculture is becoming more and more popular in North America for a number of reasons. As government bans agricultural chemicals that have been used for years due to their newly discovered carcinogenic or other health endangering potential, consumers are increasingly looking to organically grown products in an effort to help assure their own and their children's health. Environmentalists, biologists and concerned citizens are also becoming more aware of the damaging effects of concentrated agricultural fertilizers and pesticides leaching through the soil and polluting water systems.

Farmers are also questioning the long run feasibility of conventional agricultural techniques involving reliance on imported chemical fertilizers and pesticides.

This area of crop production may offer opportunities for consumers and the food industry that are presently unrealized. In other markets, farmers have recognized certain benefits offered by the production of organically grown crops that require intensive management and new production techniques. The food industry has benefitted by expanding and diversifying their markets and consumers benefit through increased satisfaction. Also important are possible benefits to health for both farmer and consumer, proven benefits in soil quality and lower input costs which help improve profit margins. Recognizing these factors, this research proposes to investigate whether demand is present in Winnipeg for organically grown vegetables.

1.2 PROBLEM STATEMENT

Vegetable production, like many other industries, depends largely, (but not exclusively), on the will of consumers to determine it's fate. If farmers produce what the public desires at a price they are willing to pay, a successful relationship results. One of the main problems faced by farmers and food wholesalers is understanding exactly what the public wishes to buy. Thus, this research will address two basic problems in the local Winnipeg vegetable market.

1. Organically grown vegetables are not readily available to the average consumer through local or convenient outlets.

2. There is very little quantified information regarding demand for fresh organically grown vegetables in the Winnipeg market.

This research will fill an information gap that presently inhibits evaluation of this market opportunity.

1.3 OBJECTIVES

The objective of this research is to evaluate the feasibility and desirability of marketing fresh organically grown vegetables in the Winnipeg market.

The specific objectives are:

1. To determine whether consumers consider it important that fresh vegetables are organically grown and free of chemical residues, and
2. To determine what premium, if any, consumers and the food industry from wholesalers to professional chefs, would be willing to pay for the opportunity to purchase fresh organically grown vegetables.

1.4 METHODS

The following methods were used to achieve the objectives of this research:

1. Review of related literature to:

- a) Define organic agriculture and discuss its significance and the reasons why interest in this area of crop production has grown in recent years.
 - b) Quantify apparent trends towards the increasing popularity of organically grown vegetables among producers, wholesalers, retailers and professional and private consumers.
2. Conduct descriptive surveys (personal interview style) to gather information on the following segments of the vegetable industry:
 - a) Consumers.
 - b) Vegetable Wholesalers
 - c) Vegetable Retailers
 - d) Institutional Buyers.
 - e) Industry Leading Chefs
 - f) Vegetable Growers
 3. Compile survey results to indicate the level of interest among the food industry and the public in purchasing fresh organically grown vegetables.
 4. Make conclusions and recommendations concerning the feasibility of introducing organically grown vegetables into the commercial markets of Winnipeg.

Chapter II

REVIEW OF RELATED LITERATURE

2.1 INTRODUCTION

This chapter discusses the important features of organic agriculture beginning with accepted definitions and a discussion of certification programs in use today. Benefits of organic agriculture are discussed in light of the solutions they offer to problems affecting conventional agriculture. This is followed by a discussion of why some people are becoming more interested in this approach to agricultural production, including concerns over health, the environment, nutrition and pesticide residues in food. Finally, a review of literature provides evidence of a growing trend towards production, marketing and consumption of organically grown vegetables, as well as other agricultural crops, to show how widely accepted organic production has become. This will include a discussion of why consumers and farmers are becoming more interested in organic agriculture and a look at current certification programs.

2.2 DEFINING ORGANIC AGRICULTURE

In 1980, a widely accepted report was released by the United States Department of Agriculture entitled "Report and Recommendations on Organic Farming". This report was a broad investigation of organic farming in its current form and provided the following definition which is widely accepted as a useful definition of alternative forms of agriculture being practiced today: (USDA 1980) "Organic farming is a production system which avoids or largely excludes the use of synthetically compounded fertilizers, pesticides, growth regulators and livestock feed additives. To the maximum extent feasible, organic farming operations rely upon crop rotations, crop residues, animal manures, legumes, green manures, off-farm organic wastes, mechanical cultivation, mineral-bearing rocks, and aspects of biological pest control to maintain soil productivity and tilth, to supply plant nutrients, and to control insects, weeds and other pests".

A number of terms are in use which are generally defined by the above definition. These include 'biological' agriculture practiced largely in England and the 'French Intensive method' and 'Ecological' agriculture, becoming more popular in North America. Other commonly used terms are sustainable, natural, ecological, regenerative and alternative. These terms all describe similar agricultural methods which have only small differences in emphasis or

philosophy. One which differs substantially is 'bio-dynamic' agriculture, practiced mostly in Sweden, Germany and Switzerland.

This similarity between terms is supported by a working paper prepared on sustainable agriculture prepared for Agriculture Canada's policy division by Robinson (1986). In the study, Robinson surveyed farmers from Ontario to British Columbia about their farming practices. One question asked what practices they used in farming while another asked what term they associated themselves with. All farmers used some or all of the methods previously described. Of 289 respondents, 50% considered themselves organic, 25% sustainable, 21% natural, 21% ecological, 9% biological, 9% regenerative and 6% alternative. The overlap in percentages is caused by farmers associating themselves with more than one term. This shows that the methods of organic agriculture described in the USDA report are sufficient to describe the methods used, regardless of the term used to describe them.

2.3 ORGANIC CERTIFICATION

Much of the organic food industry, from growers to wholesalers, retailers and consumers, are concerned with developing reliable standards and certification programs to assure concerned parties of their authenticity. Standards and legal definitions have been developed by a number of groups. Oregon, California and Maine as well as the United

States Federal Trade Commission have developed legal definitions of organic agriculture (American Society of Agronomy 1984). The International Federation of Organic Agriculture Movements (IFOAM) was formed in 1972 to serve as an international communicator and coordinator and to be "a network for the diverse bodies concerned for ecological development of agriculture in all nations" (USDA 1980). IFOAM has developed standards recognized by some 80 member groups in 30 nations with total membership around 40,000 individuals (USDA 1980). Recently the Organic Food Producers Association of North America (OFPANA) adopted IFOAM's "Standards of Biological Agriculture" for use in North America (subject to modifications due to climate etc.). Private sector interests have also developed their own certification program to assure the quality of their product, such as Oak Manor Milling. The central approaches of these programs are based on two requirements, adherence to organic production standards and certification by signed affidavit and/or on farm inspection frequently coupled with testing for residues (Garven 1981). The basis of these standards have already been discussed. For more complete detail on standards and certification programs, the California example of U.S. state laws, main documents from IFOAM (the industry leader), Living Farms of Tracy, Minnesota, considered to be the most copied organic standards program in North America, and Oak Manor Milling of Ontario as an example of the private sector approach, are reproduced as Appendix K. The adoption and

recognition of standards such as these will provide broader acceptance and add credibility to the industry. As Roberts (1985) reports, "the consumer must now accept anything labelled "organic produce" on faith. With standards that are objective, published and certified by a third party, not only will the term and the organic industry as a whole gain credibility, but a better informed public will be more apt to opt for the organic label".

Locally, a group of southwestern Manitoba farmers wants the government to regulate the production of organic food in the province. The recently formed Organic Producers' Association of Manitoba Co-op Ltd. (OPAM) has asked Agriculture Minister Glen Findlay to set up a system to certify products grown without chemicals or synthetic inputs. This would guarantee that food sold as organic would really be what it claims to be, said John Hollinger, association secretary. Farmers would be able to prove their products are organic and consumers who pay a premium for organic food would be assured they are getting what they pay for (Friesen, 1989).

Don Webster, Manitoba Agriculture director of soils and crops said the province will know soon if it can establish a method of certifying organic food. One way could be to train inspectors to examine fields and conduct tests before certifying a producer as organic. Webster recognizes that demand for organic food is growing and agrees that production standards are a good idea (Friesen, 1989).

OPAM currently sets standards that stipulate that a field must be free of chemicals and fertilizers for three years before a product harvested from it can be called organic. The association is working on standards requiring a farmer to record the full history of a field he wants certified. This would include the crops grown, yields, inputs and crop rotations for the previous three years. To have each field certified the farmer would apply to a board for approval. Fields would also be subject to inspection and verification.

Additionally, a group known as Canadian Organic Growers, Inc., has formed in eastern Canada and is also working towards an acceptable definition and certification program. Reportedly, the group is working with Agriculture Canada, although no details are available at this time.

2.4 BENEFITS OF ORGANIC PRODUCTION

2.4.1 Soil Erosion

Soil erosion has become a prominent concern in Canada since the publication of two central works, *Soil at Risk* and *Will the Bounty End*, both published in 1984. These works brought to the forefront of agricultural policy the soil problems of erosion by wind and water. This section discusses the causes of these problems in light of solutions offered by organic agriculture.

Soil erosion is a problem because only a thin layer of minerals, organic matter and soil microorganisms provide nutrients to plants. This is the most important layer known as topsoil. Although roots may penetrate this layer and gradually form new deeper topsoil through the addition of organic matter and subsequent growth in numbers of soil microorganisms, conventional agriculture has reversed the natural order. Uncultivated, virgin prairie builds up topsoil at a rate of 2.5 cm's per hectare or 380 tonnes per hectare in 300 years. A cultivated field under careful management common to organic farmers can produce this much topsoil in three years (Fairbairn 1984). Conventional farming practices are to blame for increasing soil erosion in Canada and many other countries. Moldboard plows mix soil excessively and leave it prone to erosion by wind and water. Summer fallowing and stubble burning leave the soil exposed and less resistant to erosion than continuous cropping and planting into stubble. Farmers relying on chemical fertilizers and pesticides to increase yields typically neglect soil organic matter and allow it to slowly decline (although there is some evidence that this trend may slowly be reversing). Low organic matter leads to a number of erosion problems. Declining organic matter allows soil to form smaller and smaller soil particles which are more subject to being eroded away. Low organic matter also decreases the soil's water holding capacity. Thus the soil dries out faster and small dry soil particles are more subject to being blown and

washed away by wind and runoff than are large moist soil particles laden with organic matter. In Will the Bounty End, Fairbairn (1984) estimates that losses to soil erosion range from 5.4 to 24 tonnes per hectare per year in Canada, and up to 280 million tonnes per year in the prairies alone. This erosion is estimated to have caused a reduction in prairie grain yields of 70,000 tonnes per year. This effect has not yet been felt by farmers because advances in plant breeding and intensified use of agricultural chemicals have offset the losses. However, as topsoil erodes away, farm energy inputs such as fuel and chemicals have become both more expensive and more heavily used. As soil life and organic matter decline further, farmers have been caught in a vicious cycle of reliance on chemicals which takes them further away from natural processes and not only perpetuates but aggravates their growing soil erosion problems.

Organic farming practices have been shown to solve these problems. Increasing organic matter through manure and green manure crops, continuous cropping and minimum tillage are common practices on organic farms. These practices keep the soil moist and in large particles which resist erosion and have a large water and nutrient holding capacity. Fairbairn (1984) estimates that discing rather than plowing and leaving standing stubble can cut wind erosion losses to less than 1.9 tonnes per hectare per year. The USDA Report supports this with estimates that cover crops

may reduce soil erosion by up to 50%, that chisel plows and disc implements may reduce soil erosion by 20% to 75%, and that a 1% increase in soil organic matter (in some soils) will decrease soil erosion by 10% (USDA 1980). These reports and others reach similar conclusions that soil erosion is not normally a problem on organic farms. Thus we can conclude that organic farming techniques are capable of solving most soil erosion problems.

2.4.2 Water Pollution

Another problem created by conventional agriculture is that of water pollution by pesticide and fertilizer runoff. While pesticide problems are discussed in another section, the importance of pollution by nitrogen and phosphorus cannot be ignored. Fairbairn (1984) states that agricultural land contributes 3000 tonnes of phosphorus to streams in the Great Lakes Basin. Both organic nitrogen and inorganic phosphorus are leached from fields that are overfertilized or have a low cation exchange capacity, allowing water and nutrients to run out of fields and into water bodies. These substances are widely recognized as harmful pollutants at above normal concentrations. Organic farming practices solve this problem by increasing organic matter to increase water holding capacity and cation exchange capacity to reduce leaching and runoff from fields, which lowers pollution and nutrient losses by keeping both in fields where they are useful to plants.

2.4.3 Organic Matter, Composting and Humus

On an organic farm, organic matter from plant residue (stalks, leaves) and animal manure is normally composted. Composting involves the mixing of plant residues, animal wastes and some source of nitrogen, such as oil seed meal. This mixture is piled and wetted to 70% moisture, giving rise to the rapid multiplication of bacteria which decompose the organic matter into humus, as previously described, in a time span of one to two months under good conditions. The humus is then used to increase the soil's fertility. The other advantages of composting stem from the heat (160 to 180 degrees F.) generated by the decomposition process. This heat destroys weed seeds and insects which would be problematic if added to productive areas. Composting is a similar process to that which occurs in the soil, only accelerated in it's action. Thus crop residues and animal manure may be added to the soil undecomposed, to a similar end. However, caution must be taken to maintain a carbon to nitrogen ratio in the decomposing matter of not more than 30:1. This is because nitrogen is needed by microorganisms to break down carbon, and if nitrogen is in short supply, it will be drawn from the soil. This results in a net depletion of nitrogen in the soil rather than the usual net gain resulting from the fixing of ammonia released during composting.

There are many benefits to improving the organic matter (humus) content of soil. The following list summarizes those benefits.

1. Improved storage of nutrients from increased cation exchange capacity.
2. Provides food (energy) for microorganisms.
3. Decomposition releases CO₂ which is beneficial to plants.
4. Improves water holding capacity.
5. Stabilizes soil structure and improves tilth.
6. Reduces soil crusting which harms emerging seedlings.
7. Reduces the effects of compaction, and,
8. Buffers the soil against rapid changes in Ph and salinity. (from Tisdale et. al., 1985).

In contrast, conventional agriculture widely considers animal manure to be waste, and crop residues to be "trash". Most conventional farmers and feedlots dump manure and burn crop residues as a cultural or management technique. This practice is clearly wasteful, increasing reliance on chemical fertilizers, as well as polluting land, air and water. It is apparent that conventional agriculture must, and is slowly, recognizing the importance of maintaining or increasing soil organic matter.

2.4.4 Organic Insect Controls

Insect problems are often solved by use of chemical pesticides, but some problems also arise directly from their use. One, related to the specificity of insecticides, is that effectively removing a target insect may allow another non pest insect to multiply and become a pest (Fairbairn, 1984). Another problem is that the lack of insects in numbers and in diversity discourages birds, which if not inadvertently killed by the pesticides, would normally gather to eat insects. A third and well documented problem stems from the insects ability to become resistant to once effective chemicals. Flies have been shown to become resistant to DDT and cockroaches resistant to chlordane (Ware, 1978). This leads to the need for new and more powerful chemical insecticides. Problems of developing and licensing new chemicals include nearly endless trials to find something effective followed by years of testing for harmful side effects. Many chemical companies have expanded into plant breeding as it is easier to develop a plant cultivar resistant to approved chemicals than to get a new chemical approved. Other notable effects are the biomagnification of pesticides through the food chain, drift onto sensitive crops and accidental poisoning of non target organisms, pets, livestock and humans.

Organic growers use natural systems to combat insect problems. These are recycling of nutrients from crop resi-

dues and manure, crop rotation, crop diversity and zero pesticide use. These practices are necessary to sustain the organic farm. Maintenance of soil fertility promotes healthy plants which are more naturally resistant to insect attack and disease than are under nourished plants (Horsfall and Cowling 1980, Sill Jr. 1982). Crop rotation disrupts the life cycles of insects and prevents massing of populations that could have serious effects on crops not protected by chemicals. Intercropping, or mixing of different crops in the same field, also reduces insect problems by encouraging diversity of insect species, many of which, like the lacewing and the parasitic wasp, prey on pest insects and offer natural control.

Many biological controls have been proven highly effective in fighting insect pests. Examples are the use of a predatory beetle and fly on the leaf sucking 'red scale' on citrus in California and the release of sterile males to control the screwworm fly, an animal pest in the south (see DeBach 1974). Another benefit from crop diversity is the natural diversity of insects that attracts birds that act as natural insecticides in their normal habit.

Plants are also bred to be naturally (genetically) resistant to disease and/or unattractive to specific pests. This natural resistance is classified in two general types:

1. Non host resistance - a general, broadly based resistance which prevents attack by the majority of potential pathogens. Most pathogens are parasitic bacteria and fungi which invade the plant by breaking down the tissue and entering the host, causing disease. Plants naturally repel most of these invaders with physical defenses such as the cuticle, cell walls and lignified tissue which are difficult for pathogens to dissolve. Plants also use an array of chemical defenses to prevent infection.
2. Specialized resistance - operating at the cultivar level. In the natural diversity of a plant population, individuals may be found which show greater natural resistance to pathogens than others. Plant breeders have little understanding of how this works, but are able to cross plants and breed this resistance into a cultivar. Thus resistant cultivar research and breeding are very important and promising to all forms of agriculture (from Harder, 1986).

The continuing and apparent success of organic farmers in surviving the difficult period of transition from conventional to organic farming (usually 3 - 5 years of weed and insect problems before the system begins to work well) allows us to conclude that these methods do offer feasible alternatives to chemical pest control. It is important to finally note here that these aims and methods of organic

agriculture are applicable to virtually all farmers. The techniques described above may vary slightly and may be somewhat dependant on location and climate in matters such as sources of organic matter and influences of rainfall or season length. The important consideration here is that organic agriculture as it is widely practiced, is perfectly applicable to the particular environmental parameters presented in vegetable growing regions of Manitoba.

2.5 WHY ORGANIC AGRICULTURE ?

2.5.1 Introduction

Farmers shifting from conventional to organic farming practices do so for several reasons. These have been quantified by two studies done in North America. In cooperation with the USDA's research on organic farming, the Rodale Press (a well established organization which conducts research on organic practices and publishes both Rodales Organic Gardening and New Farm periodicals), conducted a survey of it's readers. The results published in the USDA Report established the following reasons for farmers shifting to organic methods, in no established order: soil health, food safety, environmental protection, soil and water conservation, and the belief that organic agriculture produces food of superior and more healthful quality (USDA 1980). Similarly, Robinson (1986), asked farmers their reasons for making the transition to organic agriculture. Of

the 75 respondents, 49% cited concern for soil health, 32% were concerned for the health of farmer and family, 20% due to the increasing cost of chemicals, 17% over moral, philosophical or religious reasons, as well as 17% concerns over stewardship of the land for future generations, 16% environmental, 15% health of livestock and 15% over suspicion of long term effects of chemicals, as well as many other reasons. This list is reproduced as Appendix D for more complete information.

The USDA (1980) also surveyed the general public about concerns over conventional agricultural practices. Their concerns are summarized as: increased cost and uncertain availability of energy and chemicals; increased resistance of weeds and insects to pesticides; decline in soil productivity from erosion and loss of organic matter and plant nutrients; pollution of surface waters with agricultural chemicals and sediment; hazards to human and animal health from pesticides and feed additives; destruction of wildlife, bees, and beneficial insects by pesticides; detrimental effects of agricultural chemicals on food quality; depletion of concentrated plant nutrients (ie: phosphate rock); decrease in number of farms, particularly family type farms; and disappearance of localized and direct marketing systems.

2.5.2 Nutritional Considerations

The final use of many plants is for animal and human nutrition. A number of studies have examined the differences in animal growth and health when fed organic and conventionally grown food. Hodges (1977) reported that livestock require 15 percent less organically grown food stuffs compared with conventionally grown food stuffs, and are frequently more productive, and also that organic poultry required less food per dozen eggs than did the conventional flock. In the famous Haughley experiment (Balfour 1975), using an equally divided dairy cow herd, the organic herd consistently produced a higher yield of milk per pound of feed (44 percent more over five years) (Stonehouse 1981, Oelhaf 1978).

While yields are sometimes 20-25 percent lower in organically raised crops (Grower 1986), nutritional value is often greater (Stonehouse 1981). For example, Dr. Frank Eggert of the University of Maine conducted a four season test comparing tomatoes, dry beans and carrots grown with organic and conventional fertilizers. Carrots showed no difference in yield, while tomatoes and beans yielded higher with organic fertilizers. Calcium content in chemically fertilized vegetables was higher, but the organic vegetables had higher levels of potassium and phosphorus, and tomatoes had higher vitamin C (Rodales Organic Gardening November 1985). In addition, results of lower yield but higher dry

matter and nutrient levels have been reported by Hodges (1977), Schupan (1974), and Pettersson (1978). Appendices E and F show yield comparisons for organically and conventionally grown tomato, carrot and bean crops, and Appendix G shows a comparison of the mineral content of organically versus conventionally grown vegetables. These are examples of the extremely few comparative studies available. The conventional agricultural community tends to disregard this type of research (as verified by this researchers search of the Horticultural Abstracts), and organic agricultural research is often considered biased and unreliable. While the area of nutritional value of crops will doubtlessly remain controversial, another issue which requires no quantification involves what could be called the placebo effect. Regardless of research findings, many people report feeling better after switching to organic, pesticide free foods. Some people with extremely sensitive allergies can only eat organically grown produce. Even if researchers cannot quantify these effects (often called 20th Century Disease or acute multiple allergies), they are no doubt important and real to many, and perhaps warrant deeper thought and consideration by many more who are willing to experiment for the sake of better health.

2.5.3 Pesticides

One main difference between conventional and organic agriculture is in their approaches to pest and disease control. Conventional farmers typically rely on chemical pesticides (herbicides, fungicides, insecticides and nematocides) to protect their crops and maximize yield. While the effectiveness of this practice is inarguable, it's safety is subject to debate. Pesticides are very effective in their intended use, to protect crops. However, their side effects are frequently dangerous. Most obvious are the acute effects resulting from occupational and sudden exposure to large amounts of pesticides. Many commonly used chemical pesticides are moderately to very toxic to humans with an oral LD 50 (Note: whether oral or dermal, an LD 50 means a lethal dose to 50% of the population tested) of 0 to 500 mg/kg of body weight and dermal LD 50 of 0 to 100 mg/kg of body weight. Accidental poisoning frequently results in permanent disability or death. Another hazard is improper use of chemicals. Most chemicals are tested and registered for specific uses on specific crops. Appendix H lists pre harvest wait periods for insecticides on vegetables and Appendix I lists chemicals which may affect crops planted in subsequent years. These recommendations are based on the toxicity of a chemical and it's average (and detectable) persistence in plant tissues and the environment. Failure to follow these guidelines in efforts to minimize insect

damage or maximize weed control may frequently occur in two forms. One is in not allowing sufficient time for the chemical to break down before the crop is harvested, which leads to the possibility of poisoning consumers, as happened recently with cucumbers and watermelons on separate occasions. The other is in using a crop rotation that is not recommended and may lead to unacceptable residues in plants leading to varying levels of exposure to humans and food animals that may be acutely or chronically toxic. In Canada, the Health Protection Branch randomly samples food for pesticide residues and other forms of contamination. In 1986, one sample of 299 tested was found to exceed pesticide residue restrictions, and eight of 432 imported products tested had either too much residue or traces of unpermitted pesticides (Dawson 1987). No mention is made as to what percentage of produce is tested.

The most controversial issue is related to the proper use of recommended chemical pesticides in recommended amounts. Plants feed by translocating ions through the root system into the plant tissues. Pesticides enter the cation exchange system and are broken down to harmless residues in time periods varying from days to years. The United Nations Food and Agriculture Organization and World Health Organization review scientific research and recommend acceptable levels of pesticide residues in plant tissue and animal tissue that will become human food. The most dangerous of

these are the organo-phosphates and DDT, whose residues are stored in fatty tissues over and over, long periods of time. Acceptable levels are based on a "no effect" level, as tested in at least two animal species, with a safety factor of 10 or 100, for various reasons. These studies are largely based on acute toxicity data (a single dose causing immediate death). The central problem is that residues are taken up by plants and passed either directly or through animals into humans. Several studies report that chronic hazards, such as mutagenicity or carcinogenicity resulting from long term low level exposure to pesticides and their residues, may take from 30 or 40 years to two or three generations to express their effects (Matsumura 1985, Lederberg 1971).

Dr. Victor Alexander, medical director of Enviro-Health Systems, has developed the Chlorinated Pesticide Screening Test, which detects 19 of the most common pesticides to levels of .05 parts per billion. Initial results of testing 3000 people showed that 99% had some level of pesticides in their blood. Most common were hexachlorobenzene, heptachlor, DDT-related compounds, dieldrin and lindane (Schultz 1985).

This problem is becoming more evident as chemical pesticides are used for longer periods of time. Obvious examples are the banning of DDT in North America in the early 1970's due to many undesirable effects discovered after many years of use, including the cancer causing potential of

the contaminant dioxin. Recently, Lasso (alachlor) and its replacement, Dual (metalachlor), have been banned by the U.S. Environmental Protection Agency and Health and Welfare Canada as they have been linked to a cancerous nasal tumor. Very recent research has also shown a link between the widely used herbicide 2,4-D, and cancer, leading to expectation that another widely used agricultural chemical may soon be banned because no safe level of exposure exists.

In late February of 1989, a research report was released by the Natural Resources Defence Council which brought pesticides in food to the forefront of the national and international media. The non-profit group said its two year study found that 5,500 to 6,200 children now aged five or younger will develop cancer in their lifetimes as a result of pesticide residues in fruits and vegetables. It said at least three million children five years old or younger are being exposed to pesticides able to damage their nervous system at levels above those called safe by the U.S. government. The group studied twenty three pesticides and twenty seven common fruits and vegetables, but came out most angrily against daminozide (ALAR) a growth regulator used on apple crops to promote even ripening. The report said previous studies underestimated exposure risks for children because they assumed children eat similar amounts of fruit relative to their body weights. The report states that for many foods, children actually eat up to 15 to 20 times the

amount of fruits and vegetables the Environmental Protection Agency uses in setting pesticide residue limits (Winnipeg Free Press, 1989).

The spring 1989 so called 'Alar scare' brought about a flurry of media attention to the issue of pesticide residues in food. Many national and local television shows and magazines featured stories on this issue and on how many consumers were suddenly interested in buying organically grown foods. Time Magazine (March 27, 1989) reported that despite the fact that only 5% of U.S. farmers use Alar, apple sales plummeted following the release of the NRDC report. Time also said that of 320 pesticides once approved for use on food crops, 66 have been classified as carcinogens by the U.S. government, and that of those 320 pesticides, between 60% and 80% are used on produce primarily to enhance eye appeal by reducing blemishes and increasing shelf life. At the same time, Newsweek (March 27, 1989) also featured a number of stories on the panic that resulted from the Alar scare. They reported a high level of concern among Americans over food safety. In a Newsweek Poll, 756 adult respondents reported that 38% are more worried that the food they eat may be contaminated by pesticides, 44% of consumers who said they are worried have cut purchases of apples and 41% have cut purchases of vegetables, also, 73% think we should use fewer pesticides and chemicals to ensure safer food even if it means higher prices. In a related article,

Newsweek reported that food brokers have been calling every organic farmer they can find asking for as much as possible of anything they can get. George DeVault, editor of New Farm magazine says that food brokers are "desperate" for organic produce. An agricultural consultant in Nevada City, California reports that in the last year, the expense and difficulty of use of chemicals, has increased farmers requests to him for information on organic farming by two to three hundred percent (Newsweek, 1989).

The United States Environmental Protection Agency (EPA) has also taken action recently to remove widely used dangerous chemicals from the food supply. In February, 1989, EPA cancelled food uses of the fungicide Captan on brocolli, cabbage, carrots, celery (foliar), melons, squash, sweet corn and tomatoes. Use is still permitted on green onions, lettuce, strawberries, bedding tomatoes and seeds (American Vegetable Grower, 1989). The EPA has also broadened it's evaluation of the potential health hazards posed by the pesticide aldicarb. It is used in the U.S. for insects, nematodes and mites in 14 crops, including potatoes, imported bananas and coffee. Forty percent of the U.S. potato crop is treated with aldicarb and levels of 19 parts per billion, well below the "safe" level of one part per million have been found. About three percent of imported bananas are treated with aldicarb and residue levels of 23 parts per billion have been found, while the acceptable level is 30

parts per billion. Aldicarb is an acutely toxic chemical which can affect the nervous system causing nausea, headache and blurred vision. While it has not been linked with cancer, it is made from the chemical which leaked from Union Carbide's plant in Bhopal, India, killing and injuring thousands of people (Lewis, 1989).

The Canadian Broadcasting Corporation's news program "The Journal", recently commissioned pesticide tests on 28 samples of fresh fruits and vegetables purchased across Canada. 26 of 28 samples were found to contain residues of pesticides and fungicides. Celery from California and tomatoes from Mexico were found to contain residues of DDT, one of the most toxic chemicals known to man. Doug Hallet, president of the testing laboratory, said the results were conclusive proof of DDT's "active use on food crops", whether due to illegal use or relabeling of imported produce. While none of the residues exceeded government guidelines, Hallet said on the basis of the residues found, a child would be able to eat only one-half a serving of brocolli per day or one apple per day in order to not exceed the 'acceptable daily intake' of certain pesticides (Winnipeg Free Press, 1989).

The H.J. Heinz Company has also circulated a list of thirteen pesticides it does not want growers to use on fruits and vegetables grown for Heinz baby foods. These include the herbicides alachlor (Lasso) and linuron (Lorox),

the growth regulator daminozide (Alar) and the fungicide captan. These chemicals are under special review by the United States EPA for their effects on human health (Henkes, 1988).

A new group called Americans for Safe Food, says it is signing up hundreds of volunteer organizers across the country. They're forming local citizens groups to draw attention to the pesticide issue. One thing they do is urge supermarkets to stock foods that have had little or no exposure to pesticides (Henkes, 1988).

These findings illustrate some of the problems with existing regulations on the 'safe' or acceptable levels of pesticides in food. Other problems with "safe" residual levels of pesticides include assertions that dose-effect relationships are affected by environmental factors, the sensitivity of the individual and possible combination and reaction with other residues. Also of concern is the lack of human testing and the inaccuracies of extrapolating data across species, as between dogs and mice and humans. Species specificity may vary greatly between smaller species with shorter lifespans and higher metabolic rates than humans. Thus recommended residue levels may at best be seen as rough approximations, and at worst as gambling against future health problems that may be irreversible in one or more lifetimes.

2.5.4 Organic Philosophy

Organic philosophy plays an important role to many individuals involved in producing and consuming organically grown foods. The writings of men such as Wendell Berry and Wes Jackson are considered at the centre of this philosophy. These writers look at the earth from the holistic or biosphere approach, seeing agricultural production as intricately and inseparably linked to all natural systems on earth, from the food chain to global weather patterns. Their philosophy centers on being able to work within natural systems rather than trying to overcome them. Those interested in further details on organic philosophy will find the writings of Berry and Jackson widely available in bookstores and libraries.

2.6 FOOD TRENDS

2.6.1 Demand for Healthier Food

There are a number of reasons why consumers have begun to demand food that is fresher, healthier, of greater variety, and in more cases, that is grown under natural conditions and is free of pesticide residues. This section will discuss those reasons and present evidence that this trend is not a fad that will fade away, but reflects an actual change in North American lifestyles and habits.

In the 1970's, North American was swept by the 'fitness craze'. People became increasingly aware of the benefits of

cardio-vascular exercise and maintaining normal body weight. This led to the development of extensive fitness and health club industries. In Canada, the government sponsored 'Participation' program encouraged Canadians to be active and promoted the acceptability of increased physical activity for people of all ages, such as walking, running, swimming, bicycling and participating in sports.

As North Americans have become more aware of the relationship between health and exercise, they have also recognized the relationship between diet and health. Obvious developments in this area have been the relationship between fat in the diet, cholesterol and heart disease, leading people to eat less red meat and more fish, poultry, fresh fruit and vegetables. Recently, the American Cancer Society released studies indicating that there may be a link between the amount of fibre in a persons diet and their likelihood of developing certain types of cancer (particularly cancer of the colon). This led to a number of large food manufacturers basing promotions on the high levels of fibre in their product. Most prominent is the Kellogg Company of America, which featured the American Cancer Society's findings in their breakfast cereal commercials. While somewhat controversial, the intention was clearly to benefit from selling the perception of healthful food. Also recently, studies showed a link between the fibre in oat bran and lower blood cholesterol levels. This too led to a rush to mar-

ket products containing oat bran while consumers bought all they could. The rapid acceptance of these findings and their impact on commercial markets are clear evidence of the growing health consciousness of consumers, and of their willingness to purchase and use more healthful products.

A less common, but no less important influence, is a small portion of the population suffering from "20th Century Disease". This term has been coined to describe a number of people who demonstrate extreme sensitivity to a variety of unnatural contaminants, from man-made (synthetic) fibres and perfume to cigarette smoke, food additives and pesticide residues. Dr. John Gerrard of University Hospital in Saskatoon is on a committee looking at 20th Century Disease. Dr. Gerrard says that common symptoms are headaches, nausea and nondescript illness, and he has seen the health of some patients improve after they switch to eating organic food. "I have seen a child ill from eating a bought apple but able to eat an apple from the back yard that hasn't been sprayed or waxed" (Dawson 1987). Dr. Gerrard has received letters from more than 700 people in North America who believe they suffer from the disease. Professor Stuart Hill of Ecological Agriculture Projects at McDonald College in Quebec has also seen evidence of 20th Century Disease. He says "I've known people who have been bedridden for more than a year. When they've gone on a diet completely free of chemicals they recovered. If somebody slipped them an apple that had

been sprayed, they're back in bed. It's not a figment of their imagination" (Dawson 1987). While this disease seriously affects only a small portion of the population, it does have implications for the larger population. Two possibilities exist that should be considered by all people:

1. As Dr. Hill points out, the combination of contaminants in air, water, food and our personal environment (in which we live), may put sufficient stress on people and their physical health to decrease natural resistance to disease, although it may not be readily noticeable.
2. The possibility that a much larger percentage of the population suffers from milder forms of 20th Century Disease that may cause only occasional sickness, headaches, discomfort or feelings of diminished well being, but are not obvious enough to establish a cause and effect relationship in those affected people.

Other reasons affecting demand for healthier food are frequently cited as mistrust of chemicals and concern over nutrient values of foods grown under the opposing production systems, which have previously been discussed. In addition to demanding healthier food, consumers are becoming much more aware of potential health risks associated with the food we all commonly eat. Many more are becoming interested in buying vegetables free of chemical residues and preserva-

tives and are also willing and able to pay more to get what they want. The following three sections provide information to quantify these trends towards increasing demand, supply and consumption of organically grown foods, especially vegetables.

2.6.2 Quantifying Healthier Food Trends

Many sources indicate that a quantifiable trend exists towards the public's desire to eat a wider variety of fresh and chemical free foods associated with better health.

Agriculture Canada reports the results of a survey to reveal that "overall, fresh vegetables were considered by the majority of respondents to be better than both canned and packaged frozen vegetables", and further, that "one-third of respondents claimed a great concern about both the salt and sugar contents of processed vegetables. About 40% expressed great concern about chemical spray residues on fresh vegetables with a similar proportion indicating they were "somewhat" concerned" (Agriculture Canada Food Market Commentary March 1985). A 1964 survey by the Pennsylvania State University of 728 Pennsylvania households found that 41.5% felt that eating fruits and vegetables treated with pesticides was hazardous to their health. Repeating that question in 1984, two researchers found that 71% of a similar sample felt pesticide treated produce was hazardous (Henkes 1987). Further, a 1984 survey by the Food Marketing

Institute showed that 77% of respondents felt that pesticide residues in foods were a serious health hazard. Penn State researcher Dorothy Blair adds that while appearance and price are still major factors in determining sales of fruit and vegetables, "surveys indicate a good number of consumers would be willing to pay more for good looking produce grown without pesticides" (Henkes 1987).

In Agriculture Canada's publication Food Market Commentary (March 1986), Bob DeGrace, President of the Canadian Restaurant and Food Service Association, focused on trends in Canada's restaurant and food service industry. He concluded by outlining trends he believes will dominate the industry in this and the next decade. These are:

1. Canadians will continue to seek healthy and nutritious foods.
2. People will drink less liquor and more juices and other non-alcoholic beverages.
3. Canadians will continue to become more sophisticated in their eating habits, seeking a greater variety and higher quality of cuisine. But they will always want good value wherever they're eating.
4. The demand for poultry, salads and vegetables will grow stronger.

Mr. DeGrace points out that there are excellent opportunities for growers and producers to learn to specialize in

an area where they can excel and produce a unique and high quality product (Davey 1986). Michael Ramsey, Vice-president of the Vancouver based Food Tree says "a lot of investors and people in the food industry wondered if the healthy fresh food style was a kick or here to stay. Everyone agrees now that it is not a fad. The general trend is that people don't exclusively eat healthy food, but they want it to be available" (Hotel and Restaurant Feb. 1987).

Chris Manore, manager of western Canada's largest health food store, Lifestream Natural Foods in Vancouver, says that ever since the alar scare he has seen many people coming in specifically looking for organic produce of any description. The alar scare has brought in a lot of customers who hadn't even thought of organic before, and he estimates that his business has since had a 35 to 40 percent increase in business. He adds that people who are aware of their health are willing to pay the extra money for organically grown fruits and vegetables (Creighton, 1989). Also, Pat Stone, produce manager of Noah's Natural Food Store in Toronto, says that sales of organically grown foods has jumped dramatically since the release of the NRDC study linking Alar to cancer (Creighton, 1989).

Thus it is evident that more and more people are becoming convinced that the North American food market is changing and demand for organically grown food is definitely a trend and not a fad. The following section provides evi-

dence to quantify this trend. In order to show the breadth of this trend, this section goes beyond the area of vegetables to demonstrate that vegetables are only part of an industry wide trend towards healthful, organically grown foods of all descriptions.

2.6.2.1 Beef

Additional evidence of the changing desires of consumers towards healthful and fresh food is provided in the instance of red meat or beef. Steve Jones, head of market research at Agriculture Canada's Lacombe Alberta station, says consumers will see radical changes in meat merchandising in the near future (Krueger April 1, 1987). Jones says Canada Safeway is already test marketing brand name beef in Alberta. Using the brand name 'Country Cut', consumers are expected to associate high quality pre-packaged meat with superior quality, as has already proven highly successful in the United States. Jones also says consumers are increasingly concerned over residues in meat resulting from intensive agricultural practices. These residues would include antibiotics, anabolic steroids and pesticide residues. Organic beef is currently popular in the United States and sells for 20 to 30% more than regular beef (Krueger, April 1, 1987).

A Colorado rancher is now marketing a new grade of beef in the United States. The grade is USDA Natural, using the

brand name 'Coleman Natural Beef Products Inc.' Colemans products are on sale in 800 stores in 26 states. He has since been joined by 5 other ranchers producing beef under what could be considered organic conditions. Considered to taste better and proven to bring a higher price, Coleman has expanded his original herd of ten cattle to 20,000 in 1986 (Clearly, October 1986).

Additionally, Super-Valu: The Real Canadian Superstore, is now marketing a line of beef from Alberta under the Natural Choice label. This beef is raised without the use of feed additives, growth accelerators, chemicals or antibiotics, and commands a higher price than other beef. Reports from store managers are that the Natural beef has been selling better than was anticipated.

2.6.3 Filling the Demand: Producers and Marketing

Producers, wholesalers and retailers are recognizing the trend of increased popularity of organic food in North America, and are responding to meet the demand. This section will review some of the efforts being made to fill the growing demand.

One of Canada's leading organic growers and processors is Dave Reibling, co-owner of Oak Manor Farms in Tavistock, Ontario. Reibling is a member of Canadian Organic Growers and a founding member of the Organic Food Production Associ-

ation of North America (OFPANA). Since converting his conventional corn farm to a mixed farm following strict organic principles, Reibling now sells more than 100 types of organic products from buckwheat and sunflower seeds to triticale, navy beans and yellow peas. He developed his own certification program in the 1970's to help assure people suffering from 20th Century Disease that his products were chemical free (Palmer-Benson 1985).

Reibling receives more than half of his products from ten producers in the Canadian prairies whom he visits regularly to ensure his standards are being met. Products are also tested to ensure freedom from pesticides. Reibling also grows his own seed for two generations to insure it too is pesticide free. Marketing is direct or through three main distributors. The Oak Manor Farm is set up to provide wholesale services to anyone who comes to the farm to pick up goods. Three distributors also deal with Oak Manor Farms, Eco-Farms of Harriston, Ontario, Alpha-Basic of Kitchener and the Ontario Federation of Food Co-ops in Toronto. Each is required to purchase a minimum of \$1000 worth of grain or flour per week and expansion seems imminent. Plans are in the works to expand into more of eastern Canada and the United States. Reibling's philosophy is best summarized by his explanation "consumers are reminding us of the fact that we [farmers] are also food producers and that we have a responsibility for the safety and healthfulness of this food" (Henkes, 1987).

In Manitoba, Bob and Betty Kehler grow strawberries organically near Winnipeg Beach. They use manure as fertilizer and geese for weeding. They have been successful in recent years and this year expect four or five other strawberry producers to follow their lead, mostly because growing consumer concern over chemical residues in the food supply has created unprecedented demand for products grown without the aid of chemicals (Krueger, 1989).

Richarde Zilke operates a 6000 square foot hydroponic greenhouse in the Cook's Creek region of Oakbank, Manitoba. He harvests 2000 heads of lettuce per week and has found profitable markets in upscale restaurants, large food stores, health food stores and hospitals. Chefs report being very pleased with the quality of the lettuce. Most important, the greenhouse environment means no pesticides or herbicides are needed and the product is grown without chemical additives, qualifying it as organically grown by accepted standards (Manitoba Cooperator, 1989).

Dennis Vriends grows 35 kinds of vegetables on his eight acre farm south-west of Edmonton, Alberta. After eight years as an organic farmer, he says that his costs are lower and returns higher than other farmers near him. Having overcome insect and weed problems, his farm is now stable, his soil and plants healthy and able to fight off weeds, insects and disease. Marketing is done at the farm gate, at farmers markets, and a little through wholesalers.

He also admits that his farming style is also a philosophy of life: "we will fail if we are so arrogant to think we can take creation apart bit by bit, rearrange it, kill what we don't like and think we can put it together better than it was in the first place instead of cooperating with nature and using the creation with respect" (McLoughlin, 1988).

Brian and Barbara Sewchuck farm 240 acres organically north of Winnipeg. They have been organic for twenty years and are very satisfied with their results. Brian says his wheat fields yield 35 bushels per acre and he has no trouble finding markets for his organically grown wheat, milled flour and livestock (Terichow, 1989).

In Arcadia, Iowa, the Venner family raises corn, oats, soybeans and hay organically. In 1986 they sold some of their organic popcorn for 12 to 15 cents per pound, which is substantially higher than contracts for conventional popcorn in the area. They also sold organic soybeans to Specialty Grain for \$6.50 to \$7.00 per bushel. This company sells the soybeans to processors who make organic tofu, tempis and soy milk, and export about 50% of the beans to Europe (Henkes 1987).

Little Bear Milling Company of Winona, Minnesota, buys organic grains which are stone ground and sold to health food stores and food coops. President Mark Schwartz says "organically grown hard red spring wheat is in short supply" (Henkes 1987).

In 1986, Pine Ridge Farms of Subiaco, Arkansas, raised 150,000 broiler chickens organically. Buying grains from organic farmers in Illinois, Kansas and Nebraska, they received a semi-trailer of corn every nine days and a semi-trailer of soybeans every three weeks. Pine Ridge is looking for more organic feed this year as business has been so good they plan to double production for 1987 (Henkes 1987).

In Boston, the Bread and Circus Supermarket opened in 1974 as a small 'whole and natural' food store. Today they are the largest retailer of organic produce on the east coast, boasting four stores with annual sales of more than \$20 million. Director of marketing, Chris Kilham, says "we take a strong stand on quality, that's what draws customers to the store...[we] expect sales to grow as more organic foods become available" (Henkes 1987). Where possible, produce bins are labelled organically grown, and the store plans to display posters telling consumers about the farmers who grow the food. While recognizing that they serve a market of health food seekers and the wealthy patrons who appreciate and can afford quality, they believe that serving a market of 'yuppie' trend-setters is a good basis for future growth.

Colin Daniels, produce manager of Alternatives Natural Food Store in Oakville, Ontario, has found that "devoted attention to produce display, customer education and careful buying has dramatically increased sales". He adds that once

customers were educated about greens such as kale and collards, he couldn't get enough of them (Cohlmeyer 1987).

In seeking to assure customers of freedom from pesticides, a supermarket in Corte Madera, California, has purchased a triple-stage quadrupole mass spectrometer, capable of detecting dozens of pesticide residues to one part per trillion. The supermarket tests produce and labels it pesticide free or puts it on sale with a sign explaining which pesticides were found to be present (Schultz 1986).

Safeway and Raley, two of the leading supermarket chains in northern California, have begun to carry organic produce on a regular basis. Their regular stock now includes organically grown bagged, mixed mixed salad greens, baby lettuce, herbs, spinach, cherries, peaches and carrots (Rodales Organic Gardening, 1988).

In Winnipeg, Bonnie Bahrychuk, manager of Harvest Collective Inc., a private co-op type store, and the only store in Winnipeg that regularly stocks organically grown produce, says that demand is growing, especially since the spring 1989 Alar scare. Produce is brought in mostly from British Columbia and California, and although price varies from even with to triple that of conventionally grown produce, she says that sometimes shipments are sold out on the day they arrive (Krueger, 1989).

Howard Gurevich and Lucy Fulkerson both run private buying groups placing orders for about 45 people interested in buying organically grown fruits and vegetables. Both order privately through stores in British Columbia and California on a regular basis. They agree that demand for organically grown produce is growing steadily (Kreuger, 1989).

2.6.4 Restaurants

Another example of the growing demand for fresh gourmet vegetables is provided by the many restaurants now catering to concerned consumers. Appendix J provides greater detail about the menu's of some of the restaurants outlined below.

Alice Waters, the owner of Chez Panisse Restaurant in Berkely, California, long hailed as the queen mother of California cuisine, decided last year that she would advertise on menus that most fruits and vegetables served in her restaurant are organically grown. This was done in response to what she sees as shifting public consciousness and she thought that people would like to know (Winnipeg Free Press, 1989).

In Mendocino County, California, a restaurant called New Bonnevile features a one acre organic garden behind the kitchen. Gardener Stephanie Kotin and Chef Charlene Rollins gather fresh food before the restaurant opens each day. The

gardener Kotin and her husband and partner, Chris Tebutt, feel that their success stems from the quality organic food they grow, "This is food you just can't buy - because it's picked and served immediately" (Cox 1986).

In Chicago, Jerome's A Fresh Food Restaurant features "fresh food simply prepared" (Kelly and Haus 1983). Jerome's strives for food that is free of preservatives and additives, and uncluttered by fancy sauces. Bread, pasta and salad dressings, as well as all foods served are prepared in the kitchen from raw ingredients. The restaurant also uses free range chickens, locally grown herbs and vegetables when in season, and chemical free (if possible), Lake Superior Whitefish and Minnesota wild rice. Co-owner Jan Lucas attributes Jerome's success to planning, careful preparation and dedication to fresh and high quality ingredients. Jan has been known to personally inspect food suppliers to help ensure supplies are chemical free (Kelly and Haas 1983). For further information, Jerome's menu is reproduced as Appendix J.

In Washington, D.C., Nora Poullion and two partners opened Nora's, a restaurant that would "promote healthful, tasty, organic food" (Kelly and Haas 1983). Nora's goes to great lengths to serve only chemical free foods. This includes buying organic beef by the carcass and butchering it on site, and constantly changing the menu to accommodate seasonally varying supplies of organic fruits and vegeta-

bles. Nora has even used the services of a friend who is allergic to anti-biotics, "I had my friend taste our chicken to see if it really was drug free", says Nora (Kelly and Haas 1983). Fortunately, it was. Nora's has been successful for four years (1983) but Nora says she is saddened that people come because the food tastes great and don't appreciate the inherent healthfulness of organic food. Fewer than 1%, she estimates, read the back page of the menu (see Appendix J), which explains the restaurant's commitment to organically grown food.

It is necessary to note here that while demand for organically grown food has grown in recent years, there are still problems existing in the area of marketing. One of the main problems is that farmers have trouble getting their products to consumers who want organic foods. Another is that consumers have no way of telling organic farmers what food they want. In most cases, organic produce is sold direct from farmer to consumer, picked up, or delivered to high volume customers. This practice is good for information flow, but without advertising and promotion, consumers often remain unaware that the organic producer exists. This study will help overcome these difficulties by providing the kind of information needed by marketing boards, food wholesalers and producers to make informed decisions about providing organic produce to the local market.

In conclusion, the USDA Report agrees that "organic farmers have no concentrated marketing effort. There is little information on kinds of organic products that are available, the location and source of these products, and their price. There is some confusion as to what can be defined as "organically produced" food. There is also a lack of well developed alternative marketing strategies available to organic farmers. Lack of certification programs for organic food and poor understanding of certification standards by consumers are often barriers to the marketing of organically grown products" (USDA 1980). Thus we have seen how the trend towards increased demand for and use of organically grown foods has become widespread and continues to grow. From producers to retailers and restaurateurs, the trend and opportunities stemming from it are clear.

2.7 RELATED RESEARCH FINDINGS

In the time between the initiation of this project and it's final release, Agriculture Canada's Development Branch has released a similar study prepared by Baseline Market Research Ltd. of Fredericton New Brunswick. This research provided national findings on the current organic agriculture sector and the market potential for organically grown products. Most importantly, the findings of this study strongly support the findings presented herein.

The Agriculture Canada research found that the respondents that had previously and/or currently do purchase organically grown vegetables perceive them to be superior in quality, taste, healthfulness and nutrition. It also found that 80% of respondents were somewhat or very interested in buying organically grown vegetables, and 77% were somewhat or very likely to buy organically grown vegetables. Of these, the majority would pay up to 25% above the price of conventional vegetables. They also found that these findings were not limited by demographic or regional barriers (Agriculture Canada, 1988). These findings correlate closely with those presented in this report, and therefore support and add measurably to the validity of the findings presented here.

In March of 1989, additional research results were released based on an Organic Gardening Lou Harris telephone poll of 1,250 adults. This survey found the 84 % of respondents would buy organic produce if it costs the same as other produce, 49 % would buy it even if it cost more. The survey was done before the Alar and Chilean grape scares. Those who would pay more cited overall health as the top reason, followed by nutrition (20%) and taste (18%) (Healy, 1989). These results also correspond well with this research and support the findings herein.

2.8 IMPEDIMENTS TO ORGANIC AGRICULTURE

To the many who understand the implications of the benefits offered by organic agriculture, a question arises as to why organic agriculture has not gained favor and popularity more quickly. The answer to this question is controversial and often leads to emotional discussions. However, it is an issue which must be discussed and is best conveyed in the original words of the experts.

"According to our case studies, lack of communication and understanding between organic farmers and the agricultural research and extension communities has hindered the transfer and application of research and educational information. The negative attitudes of many conventional farmers and of the agricultural establishment toward organic farming have sometimes limited the acceptance of this method... Many agricultural scientists, extension workers and farmers strongly believe that organic farming is impractical or infeasible. To some extent, these views are the result of misperceptions and misunderstandings about the contemporary character of organic farming. Similarly, agricultural policy makers are not fully aware of the environmental, conservation, and energy-related benefits of organic farming" (USDA 1980).

In an article on sustainable agriculture in the Journal of Soil and Water Conservation, Bidwell (1986), is more succinct in his evaluation. He says "to the farmer interested

in reducing production costs and to members of the consuming public seeking foodstuffs free of contaminating, synthetic chemicals, it appears that collusion exists between agribusiness and state supported research agencies and that we in academia have been granted a unique licence to function as salesmen for industrial farm inputs... Scientists whose research results do not support conventional agriculture are frustrated by the slow rate at which the farm press acknowledged their information".

Robinson (1986), surveyed organic farmers and asked them what government regulations, programs and policies hinder sustainable agriculture. His findings are summarized as:

1. 38% - the policy to ignore sustainable agriculture and put too much emphasis on agricultural chemicals.
2. 25% - allowing the agricultural industry to exert excessive influence on the government.
3. 14% - insufficient research into non-chemical farming techniques.
4. 13% - simple recognition by agricultural scientists that sustainable agriculture may be a viable alternative would be of great assistance.
5. 9% - cheap food policy which forces farmers to use chemicals to maximize yields.
6. 8% - Fertilizer Act designed for chemicals, restricts import of biological soil amendments and

limits organic farmers ability to do their own on farm research.

Robinson summarized his findings as: "A strong feeling exists within the sustainable farming movement that governments are ignoring sustainable agriculture because of influence from the agricultural chemical industry. Although there may not be a conspiracy by vested interests to bury sustainable agriculture, the net result is the same. The momentum of chemical agriculture has blinded agrologists, beurocrats, the general public and politicians to the idea that maybe agricultural chemicals are the cause of, not the continuing cure for many problems in agriculture, to the idea that present agricultural technology may be failing and that fresh approaches are needed. It is also believed that faculties of agriculture, after suffering severe government funding cutbacks, have lost their freedom and objectivity by becoming too dependent on chemical companies for their research money" (Robinson 1986).

These remarks, views and findings are often controversial and perhaps strike a weak spot in those they criticize. However, they are important in three major respects. One is that they point out deficiencies in the agricultural industry at large that are widely perceived and agreed upon by a wide variety of sources within the organic agriculture movement. The second important point is that these perceptions breed contempt between two sectors of one industry that may

be forced to come together in the long run, using cooperation and integration as a survival strategy. Thirdly, these comments exemplify the dedication and commitment to the beliefs which organic farmers adhere to, and echo their deep disappointment in being rejected and ignored by the conventional agricultural community.

2.9 NATURAL RESOURCE IMPLICATIONS

One of the principle mandates of the Natural Resources Institute is "to conduct useful research in current problems of natural resources management" (Henley, NRI Bulletin 1986-87). This practicum relates closely to a number of natural resources management issues and current problems, as previously mentioned. These include energy use, soil and water conservation and agricultural pollution by pesticide and fertilizer runoff. These problems can be solved by the widespread use of organic agricultural techniques. Organic farms often suffer a negative nutrient balance if they rely solely on on-farm organic wastes. Thus organic farmers frequently recycle off-farm organic wastes such as manure, sewage sludge and processing wastes. Thus preventing these materials from being dumped as pollutants. Further benefit could be had if organic garbage from cities was composted and added to farmers fields. Organic farming techniques also protect the soil and increase water infiltration and nutrient storing ability. These methods of organic agriculture

have been shown to improve on conventional agricultural methods with respect to natural resources in terms of the productivity and tilth of the soil. The techniques of increasing organic matter, crop rotations, reduced tillage and green manures offer the benefits of increased water holding capacity, increased aeration and permeability, increased soil aggregation, decreased soil crusting and compaction and encouraging the growth of beneficial insects, microorganisms and earthworms. Thus this area of research is closely related to natural resources management and the mandates of the Natural Resources Institute.

2.10 RESEARCH LIMITATIONS

This section deals with limitations on this research project. The first is the inability to deal with economic concerns, primarily the potential costs and availability of supplies of organically grown vegetables. This is due to the lack of local experience in providing organically grown vegetables. Information on prices and supplies would have to be gathered first hand in places like British Columbia, California and Oregon, and financial constraints did not allow this. Secondly, bias throughout this research was dealt with and eliminated in two ways. Initially, research was performed under the assumption that any outcome was equally likely, and local public acceptance could not be assumed at any level. Finally, all research was performed

under the supervision of an academic and professional committee whose impartial objectivity protected against the development of research bias.

2.11 CONCLUSION

In conclusion, this review of literature has provided and discussed the accepted definitions of organic agriculture and the methods of certification used to assure consumers of the authenticity of the products they purchase. The benefits and solutions offered by organic farming methods to soil, water and the environment have also been discussed. This was followed by a review of why some farmers and consumers are becoming more interested in organically grown food, including concerns over health, the environment, nutrition and pesticides. A review of current periodicals and newspapers provided evidence that consumers want to buy food which is organically grown, and of how producers, marketing systems and restaurants are responding to satisfy those demands. Finally, impediments to organic agriculture, natural resource implications and organic philosophy were discussed. The following chapter discusses the methodology used to complete this research project.

Chapter III

METHODOLOGY

In the preceding literature review, a number of reasons were discussed for the growing popularity of organically grown food, and relevant trends were discussed. Both explicit and implicit in the discussion were a number of research needs applicable to the Winnipeg market. This chapter discusses in greater detail the methods that were used to fulfill the objectives discussed in chapter one.

1. Interview commercial vegetable growers to estimate the acceptability of shifting production and management techniques to enable them to produce organically grown vegetables. This step was carried out by conducting descriptive interviews (see Leedy 1980) with six conventional vegetable growers considered influential in the market. These were farmers from vegetable growing regions within the province of Manitoba.
2. Interviews were also conducted with the following groups considered important in the marketing and consumption of fresh produce. Interview forms and lists of those interviewed are shown in Appendices H through P.

- a) Consumers - a sample of the Winnipeg population was drawn as described in section 3.0.1. These consumers were contacted by telephone and asked to answer questions to determine fresh vegetable buying habits (types purchased, frequency), attitude towards organic versus conventional vegetables, willingness to purchase organically grown vegetables and willingness to pay a premium price for them.
- b) Wholesalers and Retailers - a small sample of industry representatives were surveyed to determine their willingness to handle and distribute organically grown vegetables. Questions included ability to handle the produce without mixing with other stocks, willingness to use a special display labelled "organically grown", and what premium, if any, they would require to provide this kind of vegetable. Wholesalers such as the Codville Company, Macdonalds Consolidated, and Western Grocers, and retail outlets such as Safeway, Superstore, and Penner Foods were asked the same questions.
- c) Institutional buyers - also interviewed were a few large institutional buyers, such as hospital or cafeteria operators who purchase large volumes of fresh vegetables. Survey questions were designed to determine if they have any propensity to pur-

chase and use organically grown vegetables if and when they were available, and what factors would be important in making their decision.

d) Restaurants - the survey of restaurants was limited to a small number which concentrate their efforts on exceptional quality, taste and freshness. Thus, it was appropriate to examine only a small number of restaurants which may be influential in setting food trends. Chefs such as Tony Murakami, executive chef at the St. Charles Country Club, Yoshitaka Chubachi, executive chef at the Royal Crown, John Reimers, food service instructor at Red River Community College and manager of the Manitoba Culinary Olympics Team, and Hans-Jergen Schweitzer, executive chef at the Winnipeg Convention Centre, were interviewed to determine if they see or wish to follow the food trends previously discussed.

3. Based on the results of surveys and interviews, results, conclusions and recommendations are presented regarding the presence of demand, willingness to pay and resultant feasibility of introducing organically grown vegetables into the Winnipeg market.

3.0.1 The Consumer Sample

The consumer sample was drawn using systematic sampling. As described in Satin and Shastry (1983), a initial sample of 100 was drawn from the most recent Who Called Me book published by the Manitoba Telephone System. This yielded a list of sample units drawn at random from the listings of non-business phones in the directory, which approximates the Winnipeg population. Each sample was of five numbers from a random location on a randomly chosen page. Each location for sampling was arrived at in the following method: Dividing the number of pages of listings by 100 yields the interval in pages between samples. Each page a sample is drawn from is divided into ten sections, and the five sample numbers are drawn from within each of the ten spaces in consecutive order. Thus a sample of five numbers in 100 locations at random within Winnipeg were drawn. These numbers were called between 1:00 pm and 10:00 pm on weekdays and on weekends to contact the broadest possible consumer group. Each group of numbers were called until a respondent was reached, with two recalls if necessary. When one response from a group was successful, the remainder of that group was deleted. This continued until a sample size of 100 respondents was reached. The sample could be extended if necessary until all 100 responses were completed.

Chapter IV

RESULTS

4.1 THE CONSUMER SURVEY

The consumer survey was completed in February of 1989. One hundred consumers, selected as described in Chapter 3, were contacted by telephone and questioned following the outline of Appendix H. The sample of five hundred potential respondents yielded ninety one responses and the sample was thus increased by ten sample groups or fifty numbers, drawn in the same manner as the original sample. This allowed completion of the full sample of one hundred respondents. The remainder of this section describes the responses of these consumers. Based on the size of the sample and the population of the City of Winnipeg, 625,304, (Statistics Canada, 1986) these results are considered accurate within ten percentage points.

4.1.1 The Sample Population

The sample population contacted is considered representative of the general population of Winnipeg, and falls within expected average parameters for a random sample. Table 1, following, describes this sample population.

TABLE 1
Sample Population Summary

	Male		Female	
Sex:	39		61	
	Age	#	Age	#
	under 21	3	51 - 60	12
	21 - 30	18	61 - 70	11
	31 - 40	28	70 +	12
	41 - 50	15		
Marital Status:	Married		Single	Refused
	78		19	3
Number of persons in household (average): 3.1				
Number of wage earners per household (average): 1.5				
Level of formal education				
Grade school	High School	College	University	refused
21	44	6	26	3

This population data is verified by its close correlation with figures provided in Statistics Canada Publication No. 95-173, Winnipeg Census Tract Profile Part 1, part of the 1986 Census. The high ratio of married to single respondents is also explained by this census, which shows that 48.9% of the population is married compared with 6.3% of people over 15 years being single. The question on annual household income has been excluded from the results because 48 % of respondents refused to disclose this information,

rendering the results of any possible calculations inconclusive.

4.1.2 Consumer Survey Results

The following section discusses the results of the consumer survey. In response to question one, 99% answered that they do purchase fresh vegetables on a regular basis, the remaining 1% indicated that vegetables were used, but that they were grown in summer and preserved by freezing or storage for off season use. Significantly, 98% responded that they buy most fresh vegetables at a supermarket, the most common being Safeway and Super-Valu.

Vegetable's purchased most frequently are illustrated in Table 2, which compares survey responses with Agriculture Canada statistics. Included is the percentage of respondents that listed each vegetable in their top five responses.

This table reveals that the top eight consumer responses are exactly the same as Agriculture Canada's top eight vegetables unloaded at Winnipeg. Only the order differs for two obvious reasons. First is seasonal use, as availability and quality of vegetables varies through the year. Second, the survey asked which vegetables were purchased most frequently, while Agriculture Canada records use as unloads in thousands of pounds. Thus the results are skewed by vegeta-

TABLE 2
Most Frequently Purchased Vegetables

Survey Rank	Vegetable	%	Ag. Cda. Rank	Vegetable
1	Carrots	65	1	Potatoes
2	Lettuce	50	2	Onions
3	Brocolli	47	3	Tomatoes
4	Tomatoes	44	4	Carrots
5	Onions	29	5	G. Cabbage
6	G. Cabbage	26	6	Lettuce
7	Cauliflower	25	7	Brocolli
8	Potatoes	19	8	Cauliflower

Source: Agriculture Canada, 1987.

bles which are purchased in large amounts and store well, specifically, potatoes and onions. With these two vegetables removed, the survey results are very acceptable.

When respondents were asked if they grow vegetable themselves, 48 % said they do and 52 % said they do not. Table 3 lists reasons given by those who do grow vegetables,

TABLE 3
Reasons For Growing Vegetables

Rank	Reason	%
1	Freshness	47.9
2	Quality	45.8
3	Hobby	43.8
4	Flavor	20.8
5	Chemicals	16.7
6	Price	14.6
7	Health	2.1

as a percentage of affirmative responses only.

Consumers were then read a brief definition of organic agriculture and asked if the meaning was clear to them. If not, the point was further discussed until the researcher was satisfied that the meaning had been clarified. They were then asked to rate on a scale of one to ten, the importance of five factors in making their vegetable purchases. The following Table 4 shows how consumers responded in terms of average (mean) rating, standard deviation from that rating and the number that rated each factor as highest or tied for highest in importance to them.

TABLE 4
Important Factors in Purchase Decisions

Purchase Factor	Mean Rating	Std. Dev.	Rated Highest *
Appearance	8.41	1.28	45
Nutrition	8.19	1.75	44
Organic. Grown	7.99	2.06	47
Locally Grown	7.87	2.16	43
Price	7.04	1.82	14

* describes in percent respondents rating each factor as highest or tied for highest in importance.

The meaning of Table 4 is quite clear. Consumers rated appearance as being of the highest average importance with the lowest deviation from that average. This means consum-

ers agreed the most that this factor should be rated highest. Nutritional content had the second highest average and second lowest standard deviation, meaning consumers also agree that this factor is very important. Organically grown and locally grown were rated slightly lower in importance, but with highest standard deviations. This implies the lowest level of agreement on the importance of these factors, or that the responses varied the most on these two factors. Also important is that price was rated lowest by a wide margin with moderate deviation. This indicates modest agreement that price is not a major factor in vegetable purchases.

The fourth column, indicating what percentage of consumers rated each factor as highest or tied for highest in importance, supports these conclusions. The largest number, 47%, rated organically grown as among the highest in importance, followed closely by appearance, nutrition and locally grown. Price was again lowest, being rated highest by only 14% of respondents. Not visible in the table is the fact that 20% rated organically grown equal in importance to appearance, leaving the number that rated appearance as the highest at 25%, and the number that rated organically grown as the highest at 27%.

When asked if they would purchase organically grown vegetables where they regularly shop, 93% responded that they would, 5% responded that they would not and 2% were

unsure. Major reasons given for this response were health concerns, 49%, concern about chemicals, 29% and other reasons, such as taste, 9%, and concern for the environment, 4%. Those that responded to the affirmative were then asked if they would go out of their way to buy organically grown vegetables. Thirty three (of the 93%) responded that they would, for the same reasons, while three were unsure. Of the 64 negative responses, major reasons were difficulty of travel, 16%, and lack of time, 2%.

Consumers were then asked what affect price would have

TABLE 5
Purchase Organic as Price Varies from Conventional

Organic Price	Yes	No	Unsure	Total
Lower	95	3	2	100
Equal	93	5	2	100
Higher	77	21	2	100

on this decision. Table 5 summarizes their responses.

Those who responded that they would buy organically grown vegetables if priced higher than conventionally grown vegetables, were asked to estimate how much higher, in percent, they would be willing to pay. Table 6 illustrates their responses.

TABLE 6

Willingness to Pay Above Conventional Price

Willing to pay up to	cumulative positive responses	actual responses
100 % more	1 or 1.3 %	1
50 % more	3 or 3.9 %	2
35 % more	4 or 5.2 %	1
30 % more	8 or 10.4 %	4
25 % more	22 or 28.6 %	14
20 % more	35 or 45.5 %	13
15 % more	42 or 54.6 %	7
10 % more	72 or 93.6 %	30
5 % more	77 or 100.0 %	5

Table 6 shows the willingness of consumers to pay above the price of conventional vegetables for organically grown ones. Clearly, most consumers are grouped between 10 and 25% above the regular price. Above a price 25 % price differential, those willing to pay drops off dramatically. Predictably, as the price change approaches zero, more consumers would purchase organic vegetables. At a 5 % price difference, all of those willing to pay more (77 of 100) would purchase them.

It should be noted here that this question is hypothetical and this was pointed out to the consumers when the question was asked. None of the respondents were aware that any organically grown vegetables were available. Presently, there are virtually none available in the commercial market in Winnipeg.

Finally, consumers were asked if other factors, such as taste or nutritional content, if shown to be superior in organically grown vegetables would have any affect on their willingness to purchase them, or on their willingness to pay more for them. In response, 90% stated that these factors would definitely make a difference, 5% responded that this would not make any difference, and 5% were unsure. This result is important because previous findings assume these factors are equal. If trials showed either or both of these factors to be superior, interest would evidently be improved.

4.2 INDUSTRY REPRESENTATIVE INTERVIEW RESULTS

4.2.1 Results of Conventional Vegetable Grower Interviews

This section discusses the results of interviews conducted between February 22 and February 28, 1989, with Manitoba vegetable growers. The interview schedule is presented as Table 8. The farmers contacted were identified as industry leaders and innovators. It was decided that this group would be interviewed because of their positions within the agricultural community. As perceived leaders, it was felt that their comments would be most applicable to the attitudes and future of the Manitoba vegetable production industry. Farmers interviewed are listed in Appendix M.

The farmers interviewed were all aware of organic agriculture and were somewhat familiar with the general meaning

of the term. Most farmers admitted having limited knowledge about the methods of organic agriculture, but cited two major difficulties they believed would apply to vegetable production.

1. Costs: Farmers believe organic farming would increase their costs, especially in the area of labor. Most stated that hand picking to remove insects and other non-chemical controls would dramatically increase their production costs, and questioned whether consumers would be willing to bear that cost.
2. Crop Risk: After the 1988 crop season in which a major drought was endured, farmers experienced increased predation by insects. They felt that because they irrigate and grain farmers do not, they were inundated with large numbers of insects which were difficult to control with available chemicals. Most believe that without chemicals they have a much higher risk of severe or total crop loss in a dry year. Also, without chemical protection, most believed that even slight insect damage would reduce their crops value, perhaps below production cost, because consumers place high value on vegetables with perfect appearance.

Notably, most farmers felt organic agriculture was an idea worthy of consideration, and recognized consumer fears

of chemical residues and their possible health affects and resulting concerns. Having made these statements, most displayed a clear lack of information on organic farming methods. They were unsure of how, and even if, a vegetable crop could be raised without chemicals. One farmer stated that he believed organic farming might be a marketing tool used by farmers unable to compete, hoping to get a higher price for their products. Two farmers stated that because they are aware of consumer concerns, they no longer spray on schedules pre-determined at the beginning of the crop year. Instead they use careful management to minimize their chemical use. Being conservative in their application of chemicals, these farmers stated that they strictly observe waiting periods and hope that their products contain no chemical residues when they go to market.

When asked what factors would determine their willingness to try organic farming, two farmers expressed no willingness to try it based on factors of cost versus risk and potential returns. The remaining four cited similar factors, most common being market demand. They felt that if this is what consumers want, they would like to provide it, assuming that consumers were willing to pay their increased costs. Note that these increased costs are not quantified, but seem to be based on perceptions founded on incomplete information. When questioned further, all farmers were unaware of specific organic methods, and had no real idea of

where they would find the information that they would need to try organic farming. Farmers were also concerned about increased competition and lowered profit margins that mean a single crop failure could precipitate major economic losses. Another concern was of risk to the food supply, and farmers were concerned that with widespread adoption of organic methods, a bad year could cause serious crop losses and potential irregularity of food supplies. They believe that this is something consumers are not prepared to risk.

All but one of the farmers interviewed were clearly convinced that a market for organically grown vegetables does exist. They felt that people are becoming more concerned about the effects of chemicals on their health and that those people are willing to pay more for produce that is free of residues.

This raises an interesting point noted by two of the farmers interviewed. These farmers felt that the most important factor was not how the crop was raised, but whether it contained any chemical residues. They thought the public should be made aware that many of their products are free of chemical residues when they go to market. Thus they suggested that regardless of growing methods, produce should be tested before going to market, and that produce which contains no detectable residues could be labelled as such. This would benefit consumers by allaying their health concerns and reward conventional farmers who are able to provide residue free crops through conventional methods.

These farmers also expressed serious concerns about their public image. They felt that organic farmers were also producing a media campaign to make conventional farmers out to be uncaring profiteers who poison the environment and harm consumers with chemicals and chemical residues. This is clearly not the case. Aside from having a strong interest in maintaining their business and thus their land, one farmer felt that all farmers have an intrinsic interest in showing the public that they are conscientious suppliers of food, and would like to retain the longstanding good image Canadian farmers have in the eyes of the public.

Four farmers expressed a willingness to try organic farming methods on relatively small plots, initially up to 5 acres. These four said they would only try vegetables they were familiar with to start, and only those they felt they had a chance to raise successfully. Also, they suggested that they would have to have support from agricultural and academic institutions. They felt that without this kind of support they would have little chance of success given the amount of information presently available to them. The farmers also suggested that testing would be necessary, for without it they would be unsure of their products, and a test performed after the product went to market that disclosed any residue level could seriously damage the reputation of any reputable and conscientious farmer. Note that with aerial spraying and resulting chemical drift, it can be

difficult for farmers to produce crops that are 100% chemical free.

Finally, with the exception of one farmer who acts as his own wholesaler, all those interviewed expressed satisfaction with the Vegetable Producers Marketing Board and were clearly willing to continue marketing through the Board in the event that they someday have organically grown crops to deliver.

4.2.2 Chef Interview Results

Five prominent chefs were identified and interviewed following the questionnaire shown in Appendix L. These chefs were chosen because of their well established and esteemed positions as industry leaders and trend-setters. All were contacted by telephone and asked to participate. Interviews were conducted over ten to fifteen minutes at the respondents convenience. Their responses and opinions are detailed in the following section. Appendix N lists the chefs and there positions.

The chefs interviewed all purchase fresh vegetables through a variety of sources, mostly the city's wholesalers, but they are also open to dealing with any source that can supply produce that meets their particular needs, including producers. These chefs use mostly what is readily available and in season, but commonly order specific vegetables from

around the world to offer their customers variety and top quality meals.

Asked what factors are important in their purchases of fresh vegetables, the chefs had one factor that was clearly of foremost importance: Quality. Quality was virtually all important to this professional group. Quality in terms of freshness, taste, appearance and texture was clearly at the top of their list. The only other factor mentioned after some thought was that the vegetables store well enough to be used rather than thrown out. Most of the chefs mentioned that price was of little concern when buying vegetables. While they would not pay any price, the portion of their budget spent on vegetables is small enough (relatively) that they would not have any trouble paying more for vegetables which they perceive as being of better quality.

The chefs also agreed that the volume of vegetables they use varies widely based on changing menus and seasonal availability. Most said they use 'lots of' vegetables, although more in summer than winter. Frozen vegetables are sometimes used because of quality, availability and low labor requirements.

The chefs interviewed were all somewhat familiar with organically grown vegetables and understood this is associated with freedom from chemical residues. Their reactions ranged from 'concerned, prefer no chemicals' and 'a good

idea in principle' to 'great, fantastic idea'. All were very much in favor of using organically grown vegetables, and some being world travelers and members of Manitoba's award winning Culinary Olympics Team, had had more exposure to them than others. One who had recently been in Japan, mentioned that in supermarkets there, vegetables are labelled to inform consumers that no chemicals have been used. Another had recently been to a seminar of the Canadian Restaurant Food Association dealing with food allergies. The seminar recognized and discussed the problem of additives and residues in food. The only problem the chefs recognized in using organically grown vegetables was that no supply is available to their knowledge, and a regular supply is relatively important to them. One did state however, that he likes to support local growers whenever possible.

When asked if they believed there was a significant difference between organically and conventionally grown vegetables, most were unsure, having had little experience with this type of produce. They did believe, however, that there would be little difference in useability and restated that they prefer the idea of no use of chemicals and were definitely willing to try organically grown vegetables.

The chefs were next asked if they would buy organically grown vegetables were they available, and what factors would be most important. The answer was clearly affirmative, with three qualifiers. The first and in some cases the only, was

quality. Given acceptable (or equal) quality, all said they would use organically grown vegetables. The other two conditions, given by some chefs, are that while willing to pay more, price must be within a reasonable percentage difference, and that a regular supply would be much more attractive. Importantly, if these conditions were met, all chefs interviewed stated a willingness to use organically grown vegetables to the fullest possible extent.

While most had already discussed the importance of price, the question was brought up again to ensure clarity. Most responded that price was of relatively low importance, such as 5 out of 10, and that they are willing to pay more for quality. Exceptions were one chef that thought the price might reflect savings on chemicals, and another, who deals in convention business and thus, due to pre-set and pre-priced menu's, is less flexible in spending than others.

All chefs agreed that their customers would prefer them to use organically grown vegetables whenever possible. For reasons such as health consciousness, fear of chemicals and psychological satisfaction, all felt that this would be something that would be desired by their customers. All were concerned that their customers be satisfied and some mentioned that they believe the public also needs to be better informed by a reliable source, and educated to the potential benefits offered by residue free food. Most felt that this was not something they could do themselves, but

would require the involvement of government or the food industry at large.

With one exception, all believed that they would gain promotional value in telling customers that they use organically grown vegetables. Again they believed their customers are becoming more aware of chemical residues and of their health, and would appreciate it if the person who prepares their food felt the same way. They noted again that co-promotion by others in the industry or government would be beneficial to all involved. The one chef excepting did so because he deals with conventions and while he believed his customers would like him to use organically grown vegetables, he did not believe this one factor alone would attract conventions. In contrast, with the additional exception of one chef at a private club, those remaining did believe that promoting this kind of produce could attract additional customers.

4.2.3 Institutional Buyer Interview Results

Institutional buyers were selected largely at random, based on varying types of food service provided. The intention was to interview those who serve large segments of the institutional market. This plan was fulfilled by talking to persons responsible for food service to university students, airline travellers, provincial institutions, hospital patients, staff and students and senior citizens. Details

on interviewees are listed as Appendix O. The interview form is presented in Appendix K. The following section discusses the results of these interviews conducted by telephone over a period of fifteen to twenty minutes at the respondents convenience.

Buyers interviewed all purchased their vegetables from Winnipeg's large wholesalers. The frequency of buying varied from monthly to three times per week. The volume of vegetables used also varied widely. Respondents were asked to estimate the number of meals they serve per day to indicate the volume of their business. Responses varied from 150 per day at the Lions Manor to 12,000 per day at the Health Sciences Centre, with the total meals served per day being estimated in excess of 14,000 per day.

Buyers were asked if they were familiar with the term organically grown and to explain their reaction to it. All were familiar with the term and all had a positive reaction. Most cited a concern over chemicals and additives and increasing consciousness of health affects. Respondents unanimously felt that this was a good idea and an area worth investigation and consideration. Some were also aware of benefits to the environment and the better taste of organically grown vegetables. Others expressed concern over storage qualities which are currently unknown.

Institutional buyers were unanimous in their belief that their customers would prefer organically grown vegetables. They stated that those who are aware would definitely prefer it, while those who are not should be informed, and that once made aware, would also likely show a preference. The Health Sciences Centre and the Department of Government Services mentioned that they have had requests from staff and managers and are aware of growing demand in this area.

When asked if they would purchase organically grown vegetables were they available, the answer was again, affirmative with qualifications. All responded that they would purchase and use them if quality, supply and price met their particular requirements. Given equal quality and price all said they would use organically grown vegetables to the fullest possible extent.

The only respondent differing on this point was from the Department of Government Services, and differed only because of the particular requirements of his position. While he agreed that he would purchase organically grown vegetables were they available, his requirements are to provide produce to a variety of Provincial Government Institutions. He noted that if requested by an institution under his mandate, he would find and purchase organically grown produce and provide it to them. His responsibility is to provide what individual managers request, conversely, he also recognized that a bureaucratic decision within the gov-

ernment could immediately swing all government institutions into using this type of produce.

The institutional buyers were then asked about the importance of price in making purchasing decisions. For this group, budgets dominate their decisions and therefore price is very important. While most say that quality is important, in this case, price is equally important and only a little discretion is available in this area. The few that do have some price flexibility said that the percent difference in price would have to be relatively small to allow them to purchase organically grown vegetables. Notable exceptions were one buyer that pointed out that if waste was lower, or edible portions higher (by weight or unit) that would offset a higher price and thus be acceptable. The other was in Government Services, and noted that if offered at a higher price he would not buy it, but if he requested it, he would pay whatever price was given. Also noted, was that if offered at an equal price, he would actively encourage it's use in all the food services he is responsible for.

When asked what factors would be important in deciding if organically grown vegetables are desirable in their operations, institutional buyers had a number of concerns based on their particular type of business. These factors are summarized below by institution type:

1. Hospitals: Consider customer satisfaction most important. Appearance is also important in food presentation. Moderate concern with health benefits and nutrition, particularly aware of patients health. Little benefit from promotion due to captive audience with exception of possible value in cafeteria operation and increased customer satisfaction.
2. Airline Service: Customer satisfaction is all important. Difficult to promote due to changing menu's and widely standardized portions and presentation. Airline customers also do not get a menu that would provide for promotion.
3. University Cafeteria: Appearance, customer satisfaction and health benefits are most important. In this case promotion could increase business.
4. Government Services: Headingly Penitentiary - captive audience with special concerns. Stability in storage is important to avoid waste with infrequent ordering. Appearance and taste are somewhat important, but not terribly because both can change or be changed considerably by processing. Produce must be amenable with processing equipment in use, example given of potato peelers increasing waste if potatoes are too bumpy. Promotion and customer satisfaction cannot increase business and seen as of little value.

4.2.4 Wholesaler and Retailer Interview Results

Wholesalers and Retailers were also contacted by telephone and fifteen to twenty minute interviews arranged at their convenience. The interview form is presented in Appendix J, and details of those interviewed are listed as Appendix P. Selection of candidates was guided by the overseeing committee and, due to the way the industry operates, by the interviewees themselves. This is because in the cases of Wholesalers McDonalds Consolidated and Western Grocers and Retailers Safeway and Super-Valu, the companies are vertically integrated and operated collectively, with individual retail produce managers having little input into what produce is available in their outlets. Thus, two of the retailers interviewed are responsible for all the retail outlets of these two chains in Manitoba. Thus the following results are considered to representative of 90% of the wholesale and retail fresh vegetable trade in Manitoba.

4.2.4.1 Wholesaler Interview Results

Wholesalers contacted were somewhat familiar with organically grown vegetables, although they had not seen many and were unaware of any details. While agreeing that this area might not be a bad idea due to health conscious consumers, they wondered what quality, supply and price would be like.

The wholesalers did not agree when asked if they believe a market does or might exist in Winnipeg for organically grown vegetables. One said he thought there might be on a small scale, another said anything is possible and some consumers would buy it, while another said he recognizes that there are markets elsewhere and there absolutely will be one here in time. Most notable, none said they thought that there was no market as all.

When asked what information they would need to be convinced that a market does exist and that consumers would pay a premium, all stated that they would need to see quantification of consumer demand. This includes the respondent who already believes a market does exist. Consumer demand is the key in this industry, comments centered around receiving information that consumers want this product, which would lead to trial runs in stores. If trial runs proved successful, they would try to move into this area on a full time basis. Other problems cited were a clear lack of information on availability, quality and costs.

Participating in this market did not present a problem to the wholesalers interviewed. Most stated that space and handling is only a problem with small quantities, and if larger quantities were being handled, it would be kept separate as a matter of course. While they also mentioned that it could increase their space requirements, they recognized that it would likely be offsetting because it would reduce

their needs for conventional produce. Finally, most agreed that if organically grown vegetables will sell, they will find space for them.

Responses to a question on requiring a premium to provide organically grown vegetables also varied widely. One respondent who had seen organically grown produce in California noted that the price there was 20% higher and thought he could get a similar price because he believes that demand exceeds supply. Another, while leery of new products, said his company would try it if they thought it would sell, but would not exceed what they believe consumers are willing to pay. Also mentioned was the perceived need for government support to do trials and open up the market rather than take on all the risk privately. The third responded that organically grown produce would not require any special handling and thus would not have costs added at the wholesale level unless unusual trimming was needed which would add labor costs. Having made these comments, the wholesalers all agreed that consumers would likely buy organically grown vegetables at a premium, provided the price difference was relatively small in percent.

While their comments were largely favorable, the wholesalers interviewed expressed a few concerns about expanding the market to include organically grown vegetables. These comments were that they expected labor costs might be slightly increased and that the produce must get here in

good shape and not need extra trimming before distribution to their customers. They also felt that this area needed careful examination, and implementation would probably require the support of the food industry at large.

4.2.4.2 Retailer Interview Results

Retailers interviewed were all familiar with the term organically grown and all but one immediately stated that they believe it is a 'great', 'excellent idea'. One qualified this by saying that it must be competitive in price with conventional vegetables. The third retailer expressed indifference and was not aware of any demand here, but was well aware of existing markets in Vancouver, Toronto, Los Angeles, and Seattle.

Two of the three retailers agreed that there could be a market for organically grown vegetables. While one noted that he felt price and quality must be competitive, the other noted that costs per pound would be higher and demand will fall as price increases. The former also said that he thinks this type of produce is coming here, and in his experience the quality will be excellent, but storage can be difficult.

The third retailer is convinced that there is a market in Winnipeg and is determined that it should be opened up. The produce buyer for Penner Foods in Manitoba stated that

he bought and retailed some organically grown vegetables from a small organic farmer in Winkler, Manitoba. In his expert opinion, the produce was of 'excellent' quality in terms of appearance and storeability.

Retailers were next asked what information they would need to be convinced that a market does exist in Winnipeg and that consumers would be willing to pay a premium. All the retailers agreed with the wholesalers in that they saw interest growing in this area and felt that a trial run was the best way to test consumer interest. Two were concerned that price could not be too high, but believed consumers would pay up to 20% more if the quality was good. The third was unsure and stated that a independent survey of consumers showing positive results would certainly be of interest.

When asked if they would want to participate in a potential market and handle stock to avoid mixing of produce, all said that they would want to carry organically grown vegetables if they would sell. They felt that space and handling would not be any problem. One stated that appearance would make for easy discrimination between produce and another thought that packaging and labelling would be the best way to keep produce separate and promote it at the same time.

All the retailers believed they would not require a premium to handle organically grown vegetables unless they incurred additional costs. Assuming that they would not need additional packaging, trimming, or handling beyond that of conventional vegetables, then no extra costs would be added on at this level. Thus, they also agreed that while consumers would likely pay more for organically grown vegetables, any price difference would not be increased by them.

4.3 DISCUSSION OF RESULTS

This section is included to provide room for discussion of the results presented in the previous section. Thus, the following section discusses the significant implications and related features of the preceding chapter, as well as some questions that arose as a result of the preceding research.

The results of the consumer survey present some interesting results. Most significant was that 93% of consumers said that they would purchase organically grown vegetables if available where they regularly shop. Of that 93%, 83% were willing to pay a premium for them. As Table 6 shows, the majority of those consumers were willing to pay up to 25% extra. Further, of all consumers, 90% said that if organically grown vegetables were shown to have superior taste or nutritional value, they would be even more willing to either purchase them or pay more. This indicated a strong level of consumer interest was present, though previously unheard.

These findings are supported by interviews with food industry representatives, who were in some cases unsure, but largely supportive and interested in the possibility of buying fresh organically grown vegetables.

Farmers were aware and slightly to somewhat interested in organic farming. Most would be interested in trying organic farming on a small scale if they were more aware of the methods. The significant factor here is that farmers not exceptionally interested in organic farming had little or no information available to them. This is true for two main reasons, the first being that the information they need is not readily available from any single source. To gain a working knowledge of organic farming, a person would need to search libraries extensively, finding a little information in a few books and a little more from a large number of periodicals. This learning process is slow, and few would have time for it. Unfortunately, the Manitoba Department of Agriculture and the University of Manitoba Faculty of Agriculture, two sources of information for farmers, have little expertise on the subject of organic farming. Regardless of various theories to explain this lack of information, the result is that interested farmers have almost no way to learn more about this method of production.

The results of interviews with industry leaders and representatives of institutional buyers, chefs, wholesalers and retailers also showed a clear level of support for the

introduction of organically grown vegetables in Winnipeg. As explained in the results, some were hesitant, some were unsure, but all were largely interested and recognized that this area was growing into a market that will soon have to be dealt with. These findings clearly indicate that the industry is ready to purchase and use organically grown vegetables.

There are four areas of these results which require further discussion. These are the questions raised by survey and interview respondents with regard to the availability of regular supply, and the quality and price of whatever supply is available, the importance of organically grown versus residue free conventionally grown and whether hydroponically grown should be included, and finally whether these results mean that a market does actually exist.

The availability of a regular supply of organically grown vegetables and their price can be dealt with together, for they are closely related. Unfortunately, current availability and regularity of supply are outside the scope of this research. However, some assumptions can be made. First, it is clear from the literature review that this type of produce is currently available in some markets. We can assume that organically grown vegetables are produced in many of the same places that conventional vegetables are, under similar conditions but different methods. Thus we know that supplies would be of the same types of vegetables

at the same time of year, and would likely be equally amenable to storage. The shortage, if any, would come from the lower demand, and thus lower supply of organically grown vegetables. Thus we can conclude that supplies are likely to be similar in variety and season to those currently available, only in smaller amounts. As demand grows, farmers will see the market and begin to supply it. The supply should, in the long run, be similar to the current one. Price was equally unknown, but economic principles dictate that under conditions of demand exceeding supply, prices would be higher than those of conventional vegetables. As supply increases to meet demand, prices would fall until an equilibrium level is reached. Note that roughly 1% of North American farmers are currently organic and while expected to grow slowly, organic produce is not expected to capture a significant share of the market in the foreseeable future.

The subject of quality, especially in terms of appearance, was also an important and poorly understood factor. Many of the people interviewed expressed apprehension about the quality of organically grown vegetables. It appeared that these concerns were unfounded and could readily be laid to rest. In speaking with a large number of people some were found that had seen and tried organically grown vegetables. These people expressed a high level of satisfaction with what they had seen and tasted. One produce wholesaler and two produce retailers had either personal or profession-

al experience with organically grown vegetables. Note that these are people who make their livings dealing with fresh produce and would be considered experts by anyone in the industry. One wholesaler visiting California noticed organically grown vegetables in a supermarket. He said he was 'shocked that the appearance was absolutely gorgeous', adding that he bought some and it 'tasted great'. The two retailers also said that the appearance of organically grown vegetables was 'great' and the quality 'excellent'. Comments such as these clearly indicated that fears of bug spots and bruises must be largely unfounded, based on belief more than fact.

Another point of discussion, one raised by farmers and others, was the importance of vegetables that are organically grown compared to ones that are hydroponically grown in nutrient solutions and ones that are conventionally grown but contain no detectable pesticide residues.

The first consideration is that of fertilizers. Organic fertilizers are from natural sources such as animal and plant manure and crushed rock. Conventional and hydroponic fertilizers are usually from chemical fertilizers which require large energy inputs to produce. The critical factor however, is, what difference does this make to the consumer who demands organically grown foods. Plant scientists claim that at the ionic level where fertilizers are taken up and used by plants, there is no difference at all between a nat-

ural and an artificial fertilizer ion. While there are differences between the two in areas such as energy balance and off farm pollution and other areas as previously discussed, the difference to the plant, to it's nutritional content and to consumers are still unknown.

In terms of pesticides, a question that arose was, while consumers clearly wanted vegetables that are free of pesticide residues, did they really care how they were produced. Organically and hydroponically grown vegetables are usually free of pesticides because they are grown without ever being sprayed. However, somewhere above 50% of conventionally grown vegetables tested by government food inspectors also contain no detectable levels of pesticide residues. This is due to proper and careful use of some pesticides that do break down completely in the recommended interval between spraying and marketing. The unanswered question then was do consumers really care how their food is produced so long as they can be assured it contains no pesticide residues when they purchase and consume it?

The remaining question to be discussed was whether from the results contained in this research, it could be determined whether a market actually exists, and of what size or importance. Unfortunately, this question can not be answered at this time. Follow up research could however, answer this question. The results herein, showed that the level of interest in organically grown vegetables was high

locally. They also showed that many people reported that they would pay more for them. What is needed next is two steps. One is to do an economic analysis of what portion of the market the respondents represent and whether that many people constitute a market of a size and value that is serviceable by large supermarkets, or by small local stores. The other step is for local retailers to do trials selling organically grown vegetables to see if people will actually have the same reported level of interest when it comes to handing over their money. Survey guides indicate that willingness is often slightly overstated when compared to tested buying habits. Thus we can conclude that many people are interested in buying organically grown vegetables, and many are willing to pay more for them, but whether this constitutes an actual market is not quantifiable at this time.

Finally, this section can be concluded by pointing out that the findings presented were positive and indicated that a substantial level of interest and willingness to pay more for organically grown vegetables was present. This finding was supported by an independent study on a national scale. While there are some minor problems yet to be sorted out, those dealing with supply and price, problems of quality have been dealt with satisfactorily. This discussion has focussed on the implications and significant and related features of the section on results. Positive findings have been discussed as well as outstanding questions and prob-

lems. The following and final chapter of this report presents conclusions and recommendations drawn from the results and discussion sections.

Chapter V

CONCLUSIONS AND RECOMMENDATIONS

5.1 CONCLUSIONS

This research has examined the potential demand for organically grown fresh vegetables in the Winnipeg marketplace. The vegetable industry has been examined and representatives interviewed. The results of this investigation have been presented, examined and discussed. From these results, three basic conclusions can be drawn.

The evidence provided herein, drawn from consumers and the fresh vegetable industry in Manitoba showed that potentially significant demand existed in Winnipeg and was waiting to be serviced. Many consumers and providers of food in the industry were prepared to purchase organically grown vegetables, and the majority of vegetable wholesalers and retailers were prepared to supply and distribute organically grown vegetables.

The most common and important reasons given by those who expressed a willingness to purchase organically grown vegetables were related to health consciousness and avoidance of chemical residues in food. As detailed in Table 4 and in the results of interviews conducted, the majority of

respondents considered it important that vegetables be free of chemical residues and expressed a preference that they be organically grown.

The majority of consumers expressed a willingness to buy organically grown vegetables, and to pay a premium of up to 25% over the cost of conventional vegetables. Of this majority, 36% were also willing to go out of their way to pay more to buy organically grown vegetables. This indicated that there was significant demand in the vegetable market in Winnipeg that was willing and waiting for organically grown vegetables.

Other conclusions that can be reached and should be mentioned are:

Farmers were willing to try organic methods, despite their lack of information, because they recognized the concerns of consumers and wished to maintain their good image in the eyes of the public. Also, farmers may benefit from the broadened market and potential economic benefits.

Chefs and institutional buyers were willing to use and promote the use of organically grown vegetables provided the supply was regular, the quality at least equal and the price within a reasonable margin.

Wholesalers and retailers were willing to supply, distribute and promote organically grown vegetables at no extra

charge, providing a few questions are answered and some support was available from industry and related institutions. Clearly, with the industry wide support and high level of interest demonstrated here, progress can and should be made to develop this market.

In summary, it is clear that consumers and industry representatives considered it important that vegetables be organically grown and free of chemical residues, and that they were willing to pay a premium for this type of produce. Farmers stated that they were interested in learning more and being able to supply this market, providing costs and returns were at least as profitable as conventional vegetables. Wholesalers and retailers were willing to carry organically grown vegetables, and concerns about appearance by both groups have been examined and findings indicated that this concern was unfounded. It is therefore appropriate that the following section makes recommendations based on the preceding results, discussion and conclusions.

5.2 RECOMMENDATIONS

Based on the findings of this research, the following recommendations are made:

1. There is evidence that demand for organically grown vegetables is substantial, and that consumers are willing to pay more for the assurance that no pesticide residues are being eaten. However, the opening

of this market depends on two further steps being taken. Further study, whether sponsored by federal and/or provincial departments of agriculture, the local academic community or private industry such as food distributors or interest groups such as the Organic Producers Association of Manitoba, is needed to provide information on the supply and price of organically grown vegetables. Wholesalers and retailers will not allocate space or begin promotions until they are convinced that a regular supply (whether local, imported or more likely a combination of the two) is available at a reasonable price. Following this, some wholesaler and/or retailer needs to take the initiative to test this market by making organically grown vegetables available in a Winnipeg supermarket and find out what the actual response is.

2. Actual retail sales trials by the large supermarkets Safeway and Super-Valu are recommended, as the great majority of consumers report that they regularly shop at these two chains and therefore are more likely to try organically grown vegetables if made available at these stores. The results also indicate that if consumers feel that organically grown vegetables have better flavor than other vegetables, they would be more willing to purchase them, and at a higher price. The comments from those who have tried organically grown vegetables indicates that taste tests would

help to increase public acceptance and therefore sales.

3. Farmers willing to try organic farming must be encouraged and informed by Agriculture Canada, the Manitoba Department of Agriculture and the University of Manitoba Faculty of Agriculture. It is apparent that a market exists that could benefit vegetable farmers in many ways. First, by expanding their markets, increasing diversity and therefore improving economic stability, and second, by lessening their exposure to harmful chemicals and reliance on energy intensive farming methods. After overcoming a transition period, farmers could benefit from a farming system proven capable of long term production, stability as well as proven safer for the farmers, consumers and the environment. The possibility of farming methods that offer this many benefits must not be ignored by anyone who preports concern for farmers.
4. The Provincial and Federal Departments of Agriculture and Academic Institutions must recognize the benefits offered to both farmers and consumers by organic farming. It is the role of these institutions to provide information to the producers who are remarkably unaware of alternatives to conventional farming. Farmers expressed interest in organic farming, but clearly had no idea of the many benefits. As organic farming has become widely recognized as a legitimate

alternative to conventional farming, and as interest grows, reliable information on the methods of organic farming should be made available through reliable sources.

5. The Manitoba Vegetable Producers Marketing Board should be prepared to market vegetables grown organically by local farmers. The market is clearly waiting for this product to be made available. Showing leadership in this area could not only provide economic benefits to the Board and its members, but early development of this market could improve both the visibility and the public image of the Vegetable Marketing Board.
6. The availability of information on organic farming is currently coming to the point where it may be possible to perform meaningful research on the potential economic benefits to farmers. Where it was previously difficult to quantify differences in input costs and farm gate prices between the two forms of agriculture, it may now be possible and useful to determine whether the differences add up to increased profits for organic farmers. This research is well suited to a graduate student at the Natural Resources Institute under the sponsorship of federal or provincial departments of agriculture which could improve their services to farmers, or by private industry which could profit from expansion of this market.

Appendix A

WHY FARMERS ARE MAKING THE TRANSITION TO ORGANIC FARMING.

	percentage of farmers who responded (number of responses in parentheses)											
	ONT		MAN		SASK		ALTA		B.C.		TOTAL	
	%	#	%	#	%	#	%	#	%	#	%	#
Better for the soil	48	(13)	42	(5)	56	(5)	57	(12)	33	(2)	49	(37)
Healthier for farmer and family	44	(12)	25	(3)	22	(2)	14	(3)	67	(4)	32	(24)
Just as, or more, profitable in the long run	44	(12)	17	(2)	11	(1)	24	(5)	33	(2)	29	(22)
Increasing cost of chemicals	26	(7)	25	(3)	11	(1)	19	(4)	0	(0)	20	(15)
Moral, philosophical or religious reasons	30	(8)	17	(2)	0	(0)	5	(1)	33	(2)	17	(13)
Stewardship of land for future generations	22	(6)	33	(4)	11	(1)	5	(1)	17	(1)	17	(13)
Better for the environment	22	(6)	33	(4)	11	(1)	5	(1)	0	(0)	16	(12)
Healthier livestock	22	(6)	17	(2)	11	(1)	5	(1)	17	(1)	15	(11)
Suspicious of long term effects of chemicals	22	(6)	0	(0)	22	(2)	14	(3)	0	(0)	15	(11)
To reduce use of chemicals	7	(2)	8	(1)	11	(1)	19	(4)	33	(2)	13	(10)
Healthier for society	7	(2)	17	(2)	44	(4)	0	(0)	33	(2)	13	(10)
Other reasons (12 in total)		(19)		(4)		(6)		(8)		(5)		(42)
Total number of farmers who responded:	27		12		9		21		6		75	

Source: Robinson 1986.

Appendix B

YIELD COMPARISONS OF FOUR CROPS.

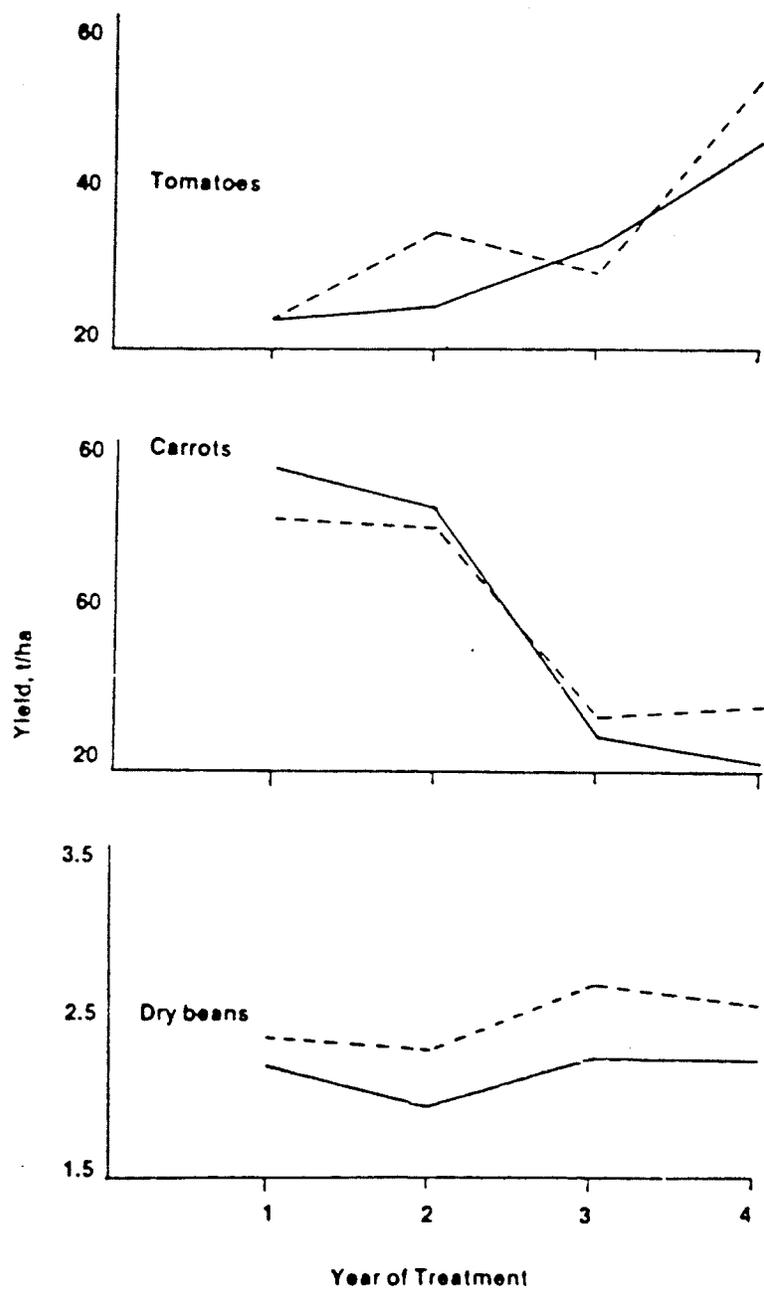


Fig. 1 Yield of marketable product from plants grown under conventional (solid line) and organic (broken line) soil management systems.

Source: American Society of Agronomy, 1984.

Appendix C

MINERAL CONTENT COMPARISON IN DRY BEANS.

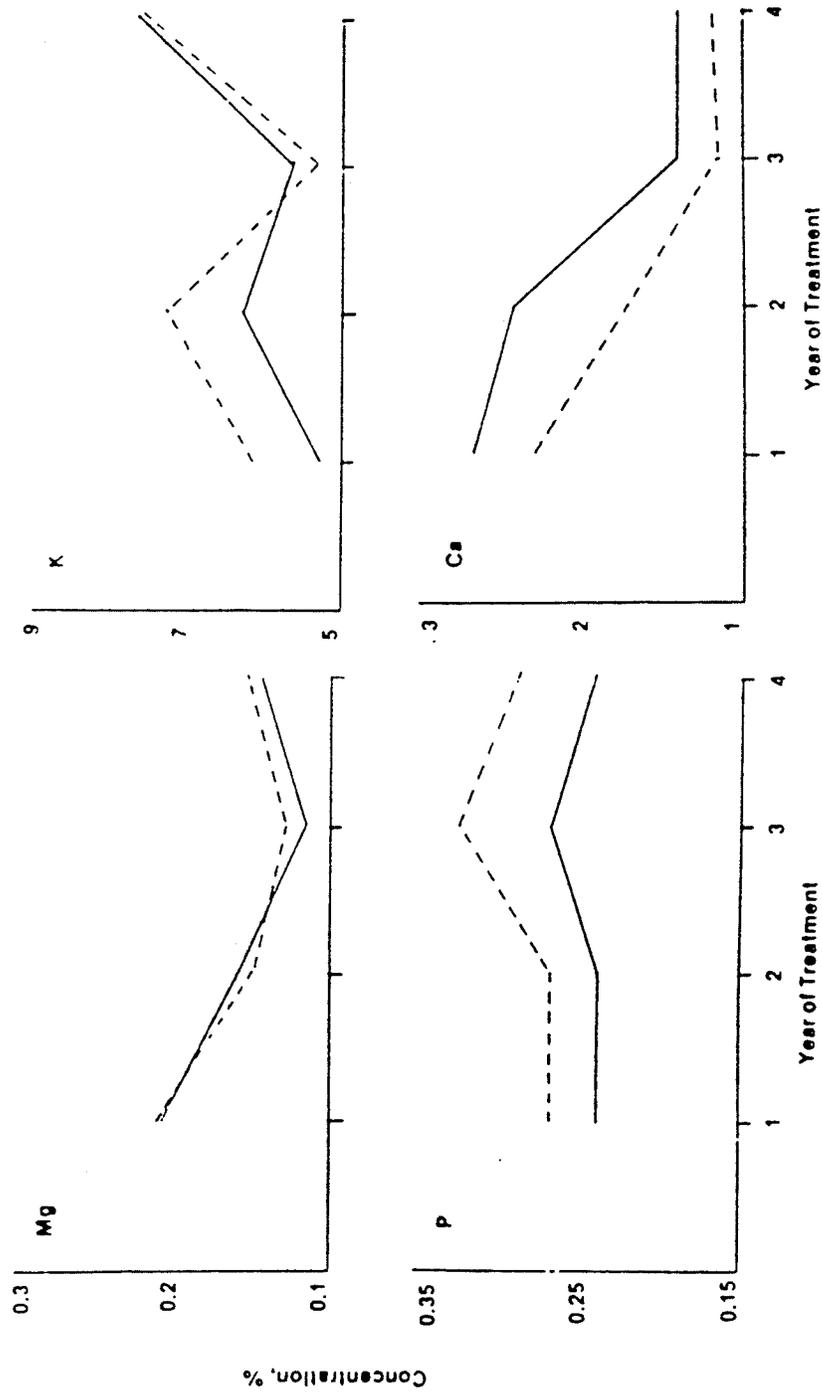


Fig. 2. Mineral concentration in dry bean petioles from plants grown under conventional (solid line) and organic (broken line) soil management systems.

Source: American Society of Agronomy, 1984.

Appendix D

MINERAL CONTENT COMPARISON IN VEGETABLES.

	Percentage of dry weight		Millequivalents per 100 grams dry weight					Trace Elements parts per million dry matter				
	Total Ash or Mineral Matter	Phosphorous	Calcium	Magnesium	Potassium	Sodium	Boron	Manganese	Iron	Copper	Cobalt	
SNAP BEANS												
Organic	10.45	0.36	40.5	60.0	99.7	8.6	73	60	227	69	0.26	
Inorganic	4.04	0.22	15.5	14.8	29.1	0.0	10	2	10	3	0.00	
CABBAGE												
Organic	10.38	0.38	60.0	43.6	148.3	20.4	42	13	94	48	0.15	
Inorganic	6.12	0.18	17.5	15.6	53.7	0.8	7	2	20	0.4	0.00	
LETTUCE												
Organic	24.18	0.48	71.0	19.3	176.5	12.2	37	169	516	60	0.19	
Inorganic	7.01	0.22	16.0	13.1	53.7	0.0	6	1	9	3	0.00	
TOMATOES												
Organic	14.20	0.35	23.0	59.2	148.3	6.5	36	68	1938	53	0.63	
Inorganic	6.07	0.16	4.5	4.5	58.8	0.0	5	1	1	0	0.00	
SPINACH												
Organic	28.56	0.52	96.0	203.9	257.0	69.5	88	117	1584	32	0.25	
Inorganic	12.38	0.27	47.5	46.9	84.6	0.8	12	1	19	0.05	0.20	

(Firman E. Baer report, Rutgers Univ.)

Appendix E

SOIL RESIDUES - HERBICIDES.

Some herbicides recommended for vegetable crops leave a residue in the soil, affecting subsequent crops in the rotation. Where growers rent land for vegetable and potato production, a detailed history of herbicide application rates and dates is strongly recommended.

The following table summarizes available information. Refer to product labels for specific information.

Product	Vegetable Crops Which May Be Affected The Following Year	Product	Residue Persistence
Atrazine (includes all products containing atrazine)	All crops except corn. Flax, peas and faba beans have some tolerance to atrazine residues. If rate of application exceeds 1.1 kg/ha active only corn should be grown the following year. Atrazine residues may persist for more than one year.	Princep Nine-T Simadex, Simazine	All crops except asparagus. Soil residues may <u>persist for two or more years.</u>
Lexone (preplant)	All crops except potatoes.	Rival, Trellan Triallurex	Red beets, cucumbers, onions, parsnips and potatoes. Corn may also be sensitive to higher rates of application.
Lontrel	Due to limited availability of recropping data for horticulture crops, only wheat, barley, rye, oats, canola (rapeseed) or flax should be grown the year after application. Lontrel may persist for 2 or more years <u>at levels that may cause injury to sensitive crops.</u>	Sencor (preplant) Sinbar	All crops except potatoes All crops except established alfalfa as recommended. Sinbar residues may persist for two or more years.
Primextra	All crops except corn. Primextra contains atrazine. See comment for atrazine.	Tordon 202C	Several broadleaf crops, including beans, peas, lentils and potatoes should not be planted until the <u>5th growing season after application.</u>

CAUTION: Tordon 202C residues may persist for 2 or more years at levels that may cause injury to horticultural crops. Tordon 202C is not recommended, for use on farms where horticultural crops are included in crop rotation, to avoid the risk of crop injury.

Source: Manitoba Department of Agriculture, 1986.

Appendix F

SAMPLE MENUS FROM ORGANIC RESTAURANTS

Since we are animated by what's on our plate, we try to keep that fuel fresh and pure, avoiding chemicals, preservatives, and processed foods. We bake our own breads and desserts, simmer our own stocks and blend our own mayonnaise and dressings. The menu reflects the seasons, representing the ideas of a few and the energy of many.

Jerome's
A FRESH FOOD RESTAURANT
2450 N. CLARK • 327-2207

WINE BAR

An opportunity to sample wines usually available by the bottle only. Selection varies.

APPETIZERS

Along with entree and wine bar selections, these are listed on our special card. The wait staff will be happy to discuss them.

SOUPS

Portages of the available & the compatible, they vary daily.

Salads & Light Entrees

California salad - curried chicken salad, with home made nut bread, and fresh and dried seasonal fruits. 6.50

Vegetables: ol. Olive + a medley of lightly cooked vegetables. Sauces will vary. 4.25

Salad Niçoise - tuna served Mediterranean style with Pommes, Romano green beans, potatoes! 4.95

Guacamole - with cilantro. Vegetables, tortilla chips accompany. 3.75

Hamburger - served on home-made bun, with vegetable and potatoes. 5.25

Bratwurst - a Sheboygan style double simmered in beer & grilled. Served on home-made bun. 4.25

Tostitos - refried beans, on a crisp tortilla with cheese, lettuce, tomato & guacamole. 3.75

DINNER ENTRÉES

Include choice of soup or salad, vegetable and potato, and our home made bread.

Veal Marsala - medallions of veal, sautéed and finished with mushrooms and a Marsala sauce. 13.95

Chicken Supremes - breast of chicken, sauté with vermouth, finished with mushrooms and oysters in a white wine sauce. 9.50

Calves Liver - prepared a variety of ways. Ask about today's presentation. 9.25

Baby Back Ribs - braised; then braised barbeque style. Half slab - 6.95 Full slab - 11.50

Sirloin Steak - dry-aged a minimum of two weeks. 13.25

Scallops - briefly sautéed, with beurre blanc. 9.95

Hunter's Chicken - half chicken sautéed and baked with vegetables, herbs, tomatoes and a robust veal stock. 8.95

DESSERTS

All are baked on the premises and vary with the bakers whim.

House Blend Coffee - Kona and French Roast

Espresso & Cappuccino - 1.50

No Cigar Smoking, Please

Lunch

Tuesday - Saturday
11:30 - 9:00

- Soups - marriage of the available and the compatible. They vary daily.
- Today's Omelette - versatile egg in a variety of roles.
- Today's Seafood - provided by our friend Jerry Woznyj at Clearwater Fisheries
- House Salad - reflects the produce selection from South Water Market. 2.00
- Sirloin Steak Sandwich - our dry-aged strip with mushrooms and onions, served on a Yeasted Croûton. 7.50
- Vegetables al Dente - a medley of lightly cooked vegetables. Sauces will vary. 4.25
- Salad Niçoise - tuna served Mediterranean style with Romaine, Romano, green beans + potatoes 4.95
- Scallops Florentine - broiled bay scallops browned with bread crumbs, spinach + lemon butter. 4.50
- California Salad - curried chicken salad with seasonal fruits and sweet bread. 6.50
- Hamburger - on home made bun with potatoes. 5.25
- Bratwurst - a Silesyan style double, simmered in beer and grilled, on home made bun. 4.25

"It is not luxury in the ordinary sense that is demanded. I have had luxurious meals ... which were costly rubbish. I have lunched on bread and cheese and beer to admiration but then the bread and cheese and beer were the best of their kind.... as a decent honest beer - if you can get any - is infinitely above third-rate champagne."
-Arthur Machen

We are not purveyors of the rare and exotic but rather of the simple, the seasonal and the fresh.

Jerome's
A FRESH FOOD RESTAURANT
2450 N. CLARK • 327-2207

Nova

We thought you would be interested in knowing where we have found the very special ingredients to prepare the meals which we serve. We feel it is equally important that the people who have worked hard to produce such fine products should be given appropriate credit.

Beef, Veal, Lamb & Pork

Supplied by Garnett-CBS (Coordinated Biofarm System). All meats are produced on small biofarms in Northern Virginia according to Garnett's "Controlled Biological Specifications." The beef is produced in Remington, the veal in Viewtown, the lamb in Culpepper, and the pork in Nokesville.

These specifications prohibit drugs or chemicals and provide kelp, alfalfa, vitamins, enzymes, minerals and roughages. The animals are raised without stress and butchered at the peak of vitality to insure highest nutritive value.

Dairy Products

Our extra rich cream is produced by the Lewes Dairy in Delaware.

Eggs are provided by the Ideal Poultry Farm in Selbyville, Delaware, where the hens run free with roosters. The hens diet exclude all antibiotics and arsenical drugs.

Herbs & Produce

In season, we obtain produce from small local farms. Fresh herbs come from The Rock Garden in West Virginia, and our own herb patch on R Street. Sources of high quality organic vegetables from mainly California and Florida are also becoming more available.

Vermont Cheddar

Selected by Lyman Orton, proprietor of Vermont County Store in Weston, Vermont.

As our menu continues to be refined, and our association with small farmers continues to grow, we can assure you of additional fresh and healthy ingredients.

Source: Kelly and Haas 1983.

Appendix G

ORGANIC CERTIFICATION, STANDARDS AND LAWS

The California Organic Foods Act of 1979 suggests that the word organic applies to food which is "naturally grown," "wild," "ecologically grown," or "biologically grown," as well as that which is "organic" or "organically grown."

According to the California law, foods bearing the above labels must meet the following requirements:

(1) "Are produced, harvested, distributed, stored, processed, and packaged without application of synthetically compounded fertilizers, pesticides, or growth regulators.

(2) Additionally, in the case of perennial crops, no synthetically compounded fertilizers, pesticides, or growth regulators shall be applied to the field or area in which the commodity is grown for 12 months prior to the appearance of flower buds and throughout the entire growing and harvest season of the particular commodity.

(3) Additionally, in the case of annual crops and 2-year crops, no synthetically compounded fertilizers, pesticides, or growth regulators shall be applied to the field or area in which the commodity is grown for 12 months prior to seed planting or transplanting and throughout the entire growing and harvest season for the particular commodity" (1).

After stipulating this list of prohibitions, the California legislators further delineated those technologies and management practices allowable under the Act as follows:

"Only microorganisms, microbiological products, and materials consisting of, or derived or extracted solely from plant, animal, or mineral-bearing rock substances, may be applied in the production, storing, processing, harvesting, or packaging of raw agricultural commodities, other than seeds for planting, in order to meet the requirements of this subdivision. However, before harvest, the application of Bordeaux mixes and trace elements, soluble kelp, lime, sulfur, gypsum, dormant oils, summer oils, fish emulsion, and soap are permitted, except the application of aromatic petroleum solvents, diesel, and other petroleum fractions, used as weed or carrot oils, are prohibited" (2).

The Act further specifies:

- (1) That its passage neither denies or confirms the notion that organic foods are in any way superior to conventionally produced food,
- (2) That any chemicals or drugs used in the production of meat, poultry, or fish to stimulate or regulate growth, or for the treatment of disease, may not be "introduced within 90 days of the slaughter of such animal...." (The time restriction is 30 days for milk-producing animals.)
- (3) That foods with pesticide residues "in excess of 10 percent of the level regarded as safe by the Federal Food and Drug Administration" may not be labeled as organically grown,
- (4) Strict and clear labeling requirements for both organically grown and processed foods,
- (5) That growers keep accurate 2-year records of their management practices, and
- (6) That processors and manufacturers must keep accurate 2-year product records, including the names and addresses of sellers.

In a general sense, the California law divided organic proponents into two camps. Those who feared that the law was so strict that many organic farmers would be unable to survive were aligned against those who argued that the bill was so badly watered down that "agribusiness interests will be able to pass-off their chemically grown produce as organic" (3). Setting a 12-month prohibition against the prior use of chemical fertilizers or pesticides was, for example, a major point of dispute. Some organic certification groups and organic food suppliers already require much longer periods. Some organic carrot growers opposed the bill's ban on use of carrot or weed oil. Given the difficulty of growing carrots organically, these producers insist that such technology is needed to control weeds. The outlawing of urea was an equally divisive issue. Some growers say that its use is absolutely essential while others view it as incompatible with organic technology. There was also some concern that local growing conditions (soil, climate, and crops produced) could markedly influence the degree of organic purity obtainable. This raises still further unresolved questions regarding the definition and meaning of "organic agriculture."

The California law also depicts what might be called "pure" organic farming. For example, synthetically compounded fertilizers, pesticides, and growth regulators are banned entirely. Many organic farmers insist on achieving at least the level of purity stipulated in the California law. Clear standards, it is argued, are essential to the growth of the organic foods industry. Many believe that consumer confidence in organic foods depends upon the enforcement of strict certification requirements.

For some organic farmers, any deviation from these standards also violates their personal values and beliefs about farming. In other words, some organic farmers follow these strict standards out of personal commitment, as well as for market considerations.

Source: U.S.D.A. 1980.



International Federation of Organic Agriculture Movements

is an international federation of:

- Organisations promoting organic gardening and farming.
- Scientists studying ecologically acceptable, sustainable systems of agriculture, and plant, animal and human nutrition.
- Those studying and developing appropriate technology for Third World agriculture.

STANDARDS OF BIOLOGICAL AGRICULTURE

FOR INTERNATIONAL TRADE AND NATIONAL STANDARDS

with restricted validity to 2 years

approved by the IFOAM General Assembly at Witzenhausen, West Germany

August 31st, 1984

This document aims to define the rules to be observed by farmers and growers practicing organic (biological) agriculture and marketing their crops and livestock products as the produce of organic (biological) agriculture. It goes without saying that each national organisation is free to complete these regulations by adding rules of its own, provided that such additions are not opposed in principle to those given in these Standards.

Suggestions from members, see point VI p. 6, "Revision of these Standards", should be sent to:

IFOAM TECHNICAL COMMITTEE

c/o Loek uit het Broek
Friedrichstrasse 2
D-6233 Kelkheim
West Germany

I. The principle aims of agriculture:

- To work as much as possible within a closed system and draw upon local resources.
- To maintain a long term fertility of soils.
- To avoid all forms of pollution that may result from agricultural techniques.
- To produce foodstuffs of high nutritional quality in sufficient quantity.
- To reduce the use of fossil energy in agricultural practice to the minimum.
- To give all livestock conditions of life that conform to their psychological needs and to ethical principles.
- To allow agricultural producers a decent return and satisfaction from their work.
- To maintain a positive relation to the natural environment on all levels.

In order to attain, or at least approach these objectives, the organic agricultural movement has adopted certain techniques whose aims are:

- 1) Avoidance of those products (chemical fertilizers*, pesticides and other chemicals of various kinds) and those methods (forcing of plant and animal growth, industrial methods of livestock management, etc.) which are in opposition to the principle aims.
- 2) Respect for natural ecological balances.
- 3) To do everything possible to ensure that the living organisms with which an agriculturist works (micro-organisms, plants and animals) become his allies rather than his enemies or slaves.

Where compromise is inevitable due to the ecological or the economic conditions in which we live, then the limits must be clearly defined. This document seeks to clarify which agricultural techniques are approved in organic agriculture, which are forbidden and which may in certain cases be tolerated.

* "chemical products", in opposition to "natural products", are products (simple or complex) obtained from:
- mineral products by chemical treatment
- natural plant material or animal tissues by chemical treatment
- chemical synthesis, whether partial or not
(definition according to A. DEHÖVE)

II. Crop production

1) Choice of crops and of varieties

Species and varieties cultivated must be as much as possible adapted to the conditions of soil and of climate, and so far as it is possible resistant to the attacks of pests and diseases. In each country, local organic agricultural advisors should be able to advise on the best adapted crops and varieties in the light of local conditions.

2) Rotations

Rotations chosen must be as varied as possible to maintain the fertility of the soil, produce healthy plants and give economic yields without need for recourse to chemical fertilizers.

Towards this goal, rotations should include legumes or temporary pastures which include legumes, (roots UK), green manures and deep-rooting plants.

3) Manurial Policy

The manurial programme must aim at maintaining or increasing the potential fertility of the soil and its biological activity. In particular, sufficient quantities of organic material must be returned to the soil to increase or at least to maintain its humus content on a long term basis...

Organic materials produced on the farm must form the basis of the manurial programme (see Appendix I).

Mineral additives may be applied exclusively in their natural form not subject to chemical treatment directed at concentration, or to rendering them more soluble. Mineral additives may be applied in relation to the results of soil analysis, in conjunction with observations made on the farm (flora, crop yields, plant resistance to parasites, health of livestock) and to general mineral balance sheet of the holding that takes into account the mineral elements contained in any purchased organic manures or fertilizers. Application of nitrogen must be in an organic* form. All synthetic nitrogenous fertilizers are forbidden.

Application of all manures and fertilizers, and particularly of nitrogen, should be effected in such a manner as to have no adverse effect on the quality of crops (nutritive quality, taste, keeping quality). Care must be taken to avoid excessive dressings of organic nitrogen which can have an adverse effect on the quality of foodstuffs (excess nitrates and nitrites) and on water. A list of authorised manures and fertilizers is given in Appendix I.

4) Pest Management

In organic agriculture the aim is to grow crops under conditions, where parasites will be of no or little economic importance. Where organic husbandry is well carried out (varieties well adapted to the environment, a balanced manurial programme, fertile soils of high biological activity, correct rotations, companion planting, green manures, etc.), this result can be obtained in the majority of cases.

* of organic, not chemically synthesized origin

The natural enemies of parasites should be protected and encouraged through provisions of conditions favourable to them (hedges, nesting sites, etc.).

All synthetic pesticides are forbidden. In case of need, recourse may be made to the products listed in Appendix II.

5) Weed Management

Weeds are controlled by a number of cultural techniques limiting their development (suitable rotations, green manures, a balanced manurial programme, early seed-bed preparation and pre-drilling, harrowing, good seed-bed preparation, etc.) and by mechanical cultivations.

Flame weeding is allowed. All chemical herbicides are forbidden.

6) Growth Regulators

All growth regulators based on synthetic hormones are forbidden.

III. Animal Husbandry

1) General Conduct of Animal Husbandry

Techniques employed in livestock management must be directed to maintaining the animal in good health without need for recourse to chemical therapeutic measures. To this end, it is necessary to select robust breeds, adapted to local conditions, and to have this factor in view when selecting breeding stock.

Housing and other environmental conditions must be adapted to the psychological needs of stock (see Appendix III).

Industrial methods of animal husbandry, as well as treatments directed to modifying animal behaviour, are forbidden.

Definitions of industrial animal husbandry are given by national organisations in their own standards.

Veterinary medicine should, so far as possible, make use of natural therapeutic methods (homeopathy, aromatherapy, phytotherapy, etc.). Use of all chemical insecticides is forbidden.

2) Animal Nutrition

The diet must be balanced, of good quality, and produced according to the techniques of biological agriculture. In general, complementing feedingstuffs bought in should be the produce of biological agriculture. Departures from this rule, as specified in Appendix III, will be allowed where they are agreed upon by the national organisations representing biological agriculture.

Use of foods containing antibiotics, urea, synthetic amino acids, anti-coccidiosis products or hormones is forbidden.

IV. Storage, Conservation and Processing

All chemical treatment as an aid to conservation during storage is forbidden. Irradiation and anti-sprouting treatment is forbidden.

The processing and transformation of primary products must be carried out without chemical additives or treatment. An appendix to the present document clarifying the methods permitted in the case of each product will be issued later.

V. Conditions In Which These Standards Apply

1) Liability

A producer can only sell his products with the label "Produce of Organic Agriculture" if he applies these minimal standards.

2) Conversion to Organic Agriculture

Conversion to organic agriculture must be effected according to a progressive plan aimed at conversion of the entire holding within a period which should be fixed by every national organisation. In general the time taken for conversion should not exceed one complete rotation. With livestock farms, conversion should take place more quickly.

In cases of particular difficulty, certain exceptions to the above rule may be allowed; for example, where orchards form part of a holding or where a conventional poultry unit forms a part of a holding economically unviable without it. Such exceptions must be agreed by the national organisations representing organic agriculture.

In general, produce may only be sold with the description "Produce of Organic Agriculture" after a period of conversion of two years (third harvest). This period may be reduced to one year in the case of holdings, where during the years immediately preceding conversion techniques closely allied to those of biological agriculture have been employed. In such cases applicants must supply details of techniques and of products used. The national organisations will then decide whether it is appropriate to reduce the period of conversion to one year.

During the period of conversion, produce may be sold under an appropriate label; for example, "Produce of Organic Agriculture in Process of Conversion".

3) Labelling

A producer who has undertaken in writing to conform to the standards of one of the organisations subscribing to the present common international standards has the right to sell his produce with the label "Produce of Organic Agriculture".

It is desirable that this description should be elaborated upon on labels or on containers by a more precise description of the techniques employed (e.g. "Produced without chemical fertilizers and sprays").

Producers who make use of specific methods, such as the bio-dynamic method, may state this on their labels.

4) Control

It is strongly recommended to national organisations that they subject their members to regular tests of their soils and of their produce. Tests made on produce should refer in particular to pesticide residues and, in the case of vegetables, to nitrates and nitrites. Producers who have converted the entire farm are not allowed to have products in their possession forbidden by these standards.

VI. Revision of These Standards

It is proposed that the present standards should be revised every two years as follows.

The Technical Committee of IFOAM should suggest modifications, which will be communicated to all members, at latest six months before the bi-annual General Assembly. The proposals of the Technical Committee, modified in the light of suggestions from members, will be submitted to the General Assembly for approval.

APPENDIX I

APPROVED MANURES AND FERTILIZERS

1) Organic Manures Produced on the Holding

Farmyard manure, composted in heaps or on the surface;
Crop residues;
Green manures;
Straw and other mulches;
Slurry and urine (after stirring and where possible, aeration);
Compost made from any non-polluted organic residues, produced on the holding or brought in.

2) Manures and Fertilizers Brought In.

Slaughterhouse wastes;
Farmyard manures, excepting, in so far as it is possible, manures resulting from factory farming methods, properly composted or aerated (1 & 2).

1. Manures resulting from industrial animal husbandry may, in certain cases, be tolerated, but only after being composted. The composting process degrades antibiotics.
2. The problem of sewage sludge and of urban composts is a particularly difficult one. Due to the risk of pollution, it would seem prudent to forbid their use in organic agriculture. They constitute, however, a valuable source of organic matter, which it is desirable to recycle.

Their quality depends on their origin and the manner in which they have been treated. In certain cases, it appears, that dustbin refuse can be used safely. In the case of sewage sludge, more caution is necessary, since it often contains heavy metals. If national organisations allow the use of dustbin refuse and/or sewage sludge, they should clarify the conditions in which these may be used and the guarantees, that are given for them.

Peat (without chemical additives);
Straw;
Seaweed and seaweed products;
Organic by-products of the foodstuffs and textile industries, provided that they are neither polluted nor contain chemical additives;
Composted sawdust, woodshavings and bark, provided that they come untreated timber;
Guano.

3) Mineral Additives

Pulverised natural rock;
Calcareous and magnesium amendments;
Calcified seaweed;
Natural phosphates.

In certain cases, to be defined by each national organisation and with the approval of technical consultants, the following products may be used pending further decision:

basic slag, patentkali, natural potassium sulphate, trace elements in the form of salts, kieserite.

During the period of conversion Chilean nitrate of soda or urea (theoretically forbidden in biological farming) can be used, on a yearly basis, only after approval of the organisation to which the farmer belongs.

4) Compost Activators

Microbial activators;
Various plant-based preparations;
Bio-dynamic preparations.

APPENDIX II

PEST AND DISEASE MANAGEMENT

1) Biological Pest Management

Introduction of predators or of parasites of noxious insects, (e.g. trichogrammes);
Sexual lures;
Use of sterilized males.

2) Products for Plant Disease Management

Plant-based preparations;
Sulphur;
Copper salts;
Silicate of Soda;
Permanganate of Potash (only for seed dressing)

3) Products for Pest Management

Bacillus thuringiensis;
Pyrethrum;
Rotenone;
Quassia;
Pure paraffin oil;
Soft soap;
Nicotine, in cases of absolute necessity (to be used as little as possible and with precautions) and only if allowed by the national organisation concerned;
Metaldehyde, the use of metaldehyde is not encouraged, but in case of extreme need must be allowed, only when applied in some sort of trap, hidden from other wildlife.

4) Various

Numerous preparations aimed at limiting the development of certain parasites and at re-enforcing the natural resistance of plants may be used; plant-based preparations (liquid manure made from nettles, decoction of equisetum, absinth, tansy, etc.).

APPENDIX III

LIVESTOCK MANAGEMENT AND FEEDING

1) Stocking Rate per Hectare

It is desirable not to exceed the equivalent of 2.5 large animal units.

2) Bought-In Feeding Stuffs that are not Organically Produced

Where it proves impossible to purchase certain feeding stuffs from organic sources, the national organisations may allow that a small proportion of the food consumed by livestock (a maximum of 20 % on a dry matter basis) may be of non-organic origin. The use of such feeding stuffs may only be allowed after analysis for residues. Maximum levels of residues must be fixed by the national organisations.

3) Veterinary Medicine

A list of recommended veterinary products, also of products that may be allowed in certain cases, will be issued later. In the meantime, national organisations should seek to establish provisional lists of products which may be used by livestock producers.

In cases of veterinary treatment, with the use of chemical products, antibiotics, hormones and similar products, the treated animals and their products cannot be sold under the label "Produce of Organic Agriculture" during a period set up by every national organisation.

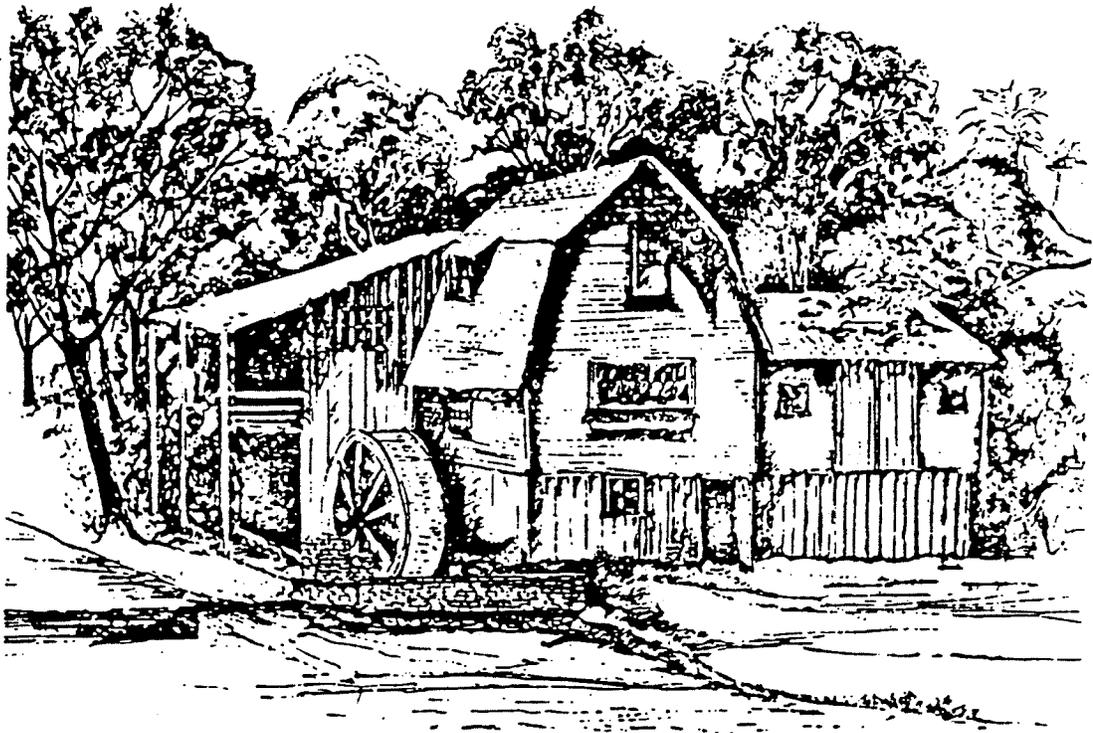
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Standards

1. Soils upon which Living Farms brand production is grown shall have been treated in accordance with the following standards for a continuous period of at least thirty-six (36) months from the time of certified production harvest.
2. Soil enrichment products acceptable for use on Living Farms certified land shall be only (a) organic matter products which have not been chemically fortified, (b) natural rock products which have not been mined or processed with the addition of synthetic chemicals, (c) beneficial bacteria and algae cultures which are not chemically fortified, and (d) earthworms.
3. Insect Control products acceptable for use on Living Farms certified land shall be only (a) predatory insects, (b) insect disease cultures, (c) attractants, only in cases of emergency (d) rotenone, pyrethrum, ryania, or sabadilla.
4. Weed Control on Living Farms certified land shall be done only by crop rotation, hand or mechanical cultivation techniques, or by cutting of weed patches.
5. Rodent Control on Living Farms certified land shall be done only by the introduction of the rodents natural enemy, natural repellent techniques, or by traps.
6. Fungal or bacterial diseases of Living Farms brand production can be controlled only by the use of any products acceptable under Item 2 (Soil Enrichment products).
7. Drying of Living Farms brand production shall be done by natural field drying, bin aeration, or by artificial drying at a temperature not to exceed 160 degrees F.
8. If fumigation is needed in the storage of Living Farms brand production, only diatomaceous earth shall be used.
9. Production on fields which shall have produced for harvest corn following corn, cereal grains following like cereal grains, soybeans following soybeans, etc., in both the year of production and the preceding year, shall be ineligible for marketing under the Living Farms brand designation. This does not apply to such perennial crops as alfalfa, orchard trees, maple trees, or crops which require more than one year to mature.
10. All production marketed through Living Farms must meet the standards for U.S. No. 1 production as set by the U.S. Department of Agriculture and the U.S. Food and Drug Administration.

11. All production marketed through Living Farms will meet or exceed the standards for organic production as set by any state or federal agency.

12. Adherence to the above standards for Living Farms brand production must be attested to upon each shipment by the affidavit of the producer.



DOCUMENT ONF - CP - X - 1
STATEMENT OF ORGANIC FOODS POLICY

Telephone: (519) 662-238:
Telex: 069-55290



OAK MANOR MILLING

R.R. 1, Tavistock, Ontario, Canada N0B 2R0

FOREWORD, DECEMBER 1, 1982.

In order to establish terms of reference whereby we, Oak Manor Farms Inc., and you, the scrutineer, can agree on a definition of things on some common ground, we must start with first principles, as reflected in the following:

WHAT IS AN ORGANIC (ORGANICALLY-GROWN) PRODUCT?

It is a product which is raised, grown and/or processed naturally without the use of chemicals or synthetically produced fertilizers, herbicides, insecticides, fungicides, growth hormones or regulators, or excessive heat.

ARRIVING AT THE ABOVE

Soil fertility is maintained by preserving the micro-organisms and humus in the soil to make nutrients available to plants. The micro-organisms must be protected from any chemical or cultivation practices which may be harmful to them.

Organic matter in the soil is necessary to these micro-organisms and must be replaced consistently, if soil tilth is to be maintained.

The organic matter can be replaced and in some cases increased by the application of raw or composted animal manures and wastes, crop residues, peat, seaweed and other seaweed products, fish wastes, green manures, the growing of legumes, and a strict regimen of crop rotation.

All of the above may be used, providing only that the above processes as described, be free of artificial or synthetically produced chemicals.

ADMINISTRATION

Given that the above facts represent the frame-work or philosophical base of a certification program, a company, association, or individual must have some means of verifying that a crop has been raised in such a manner.

Furthermore, there must be some means of maintaining a separate identity for the crop, after harvesting, during processing, and during and after shipment.

We at Oak Manor Farms accomplish these tasks through a comprehensive and thoroughly up-dated, on-going program of organic certification.

The program which we have established includes (a) personal, sustained interaction with all of our growers as a means of insuring against mis-representation; (b) regular consultative field inspections at our growers' farms wherein we inspect them for indication of complete adherence to our rules; (c) complete documentation insuring the integrity of the foodstuffs; (d) regular protein, moisture, bushel weight, dockage and other tests through independent labs, and through the Canadian Grain Commission.

With these facts in mind, please feel free to scrutinize our program.

Canada's Leader In Organically-Grown Grain Products

DOCUMENT OMF - CP - X - 3
RECOMMENDED ORGANIC STANDARDS

Telephone: (519) 662-2385
Telex: 069-55290



OAK MANOR MILLING

R.R. 1, Tavistock, Ontario, Canada NOB 2R0

NOTE: FOR YEARS OAK MANOR WORKED WITH OTHER GROUPS TO FORM THE CANADIAN ORGANIC CERTIFICATION ASSOCIATION, WHICH ESTABLISHED COMPREHENSIVE STANDARDS FOR ORGANIC FARMING. THOUGH COCA IS NOW INACTIVE, WE FEEL THAT THE STANDARDS ESTABLISHED BY IT ARE STILL ALIVE AND REPRESENT THOSE IDEALS WHICH WE CONTINUE TO FOLLOW AND ENCOURAGE YOU TO FOLLOW.

CANADIAN ORGANIC CERTIFICATION ASSOCIATION

DOCUMENT COCA-A100

The Canadian Organic Certification Association (hereafter referred to as the Association), certifies that the products identified as Batch # _____ meets or exceeds the recommendations for agricultural production as established by the Association and outlined below. The Association acknowledges that it has on file a signed statement from the producer(s) of Batch # _____ indicating that the producer has adopted the organic recommendations for agricultural products established by the Association.

ORGANIC RECOMMENDATIONS FOR AGRICULTURAL PRODUCTS ESTABLISHED BY THE ASSOCIATION

1. Soils upon which Batch # _____ are grown shall have been treated in accordance with the following recommendations for a continuous, uninterrupted period of not less than 36 months prior to the harvest.
2. Soil enrichment products acceptable for use shall be only, (a) ORGANIC* matter products which have not been chemically fortified, (b) NATURAL** rock products which have not been mined or processed with the addition of synthetic chemicals, (c) Bacteria and Algae cultures which are not chemically fortified, (d) Earth worms and earth worm castings.
3. Insect control products acceptable for use shall be: (a) Predatory insects, (b) Insect disease cultures, (c) Attractants, (d) Natural insecticides which are unfortified by chemicals including the following: PYRETHRUM, ROTENONE, RYANIA, SABADILLA, BACILLUS THURINGENSIS.
4. Weed control shall be done only by crop rotation, and or mechanical cultivation techniques, by cutting of weed patches or by mulching with natural matter.
5. Rodent control shall be done by the introduction of the rodents' natural enemies, by traps, or by such man-made devices as approved in writing by the Association.
6. Fungal or bacteria diseases shall be controlled by the use of any product acceptable under item two, soil enrichment.
7. Crop rotation shall be utilized to insure that continuous cropping of the land with the same crop is avoided.
8. All seed varieties used must be approved by the Association. No chemically treated seed shall be used.
9. The border land between approved crops and other crops shall be a minimum distance of 8 feet.
10. All drying of approved crops shall be done by natural field drying, bin aeration, or by artificial drying at a temperature not to exceed 110 degrees Fahrenheit in the warm air plenum. Kernel temperature shall not exceed 110 degrees Fahrenheit in the drying process.
11. Insect control during storage shall be done by using diatomaceous earth.
12. The moisture content of any stored grain shall never exceed 14%.
13. All approved crops must meet or exceed the minimum grade standards for quality as established by the Canadian federal or provincial agricultural ministries.
14. All approved crops must meet or exceed any standard set for organic production by any Canadian federal or provincial agency.
15. Adherence to the above recommendations must be attested to upon each harvest by a signed statement by the producer.
16. The Association's agent shall have the right to periodically inspect the fields, crops and farm premises of the producer.
 - * ORGANIC: derived from living organisms.
 - ** NATURAL: not made, manufactured or obtained by artificial processes.
(OXFORD ENGLISH DICTIONARY, OXFORD UNIVERSITY PRESS, 1933, VOLUME III)

ENVIRONMENTAL DISCLAIMER

Providing the producer has subscribed to all of the above recommendations and has certified their truth by written statement, he and the Association shall not be held responsible for the effects of general atmospheric pollution, acid rains, wind drift, nuclear contamination, spill over from neighbouring lands, or any other effects beyond their reasonable control.



GROWER AFFIDAVITS OF GUARANTEE

Telephone: (519) 662-2385
Telex: 069-55290

OAK MANOR MILLING

R.R. 1, Tavistock, Ontario, Canada N0B 2R0

NOTE: THE TWO AFFIDAVITS OUTLINED BELOW WERE EVOLVED BY THE CANADIAN ORGANIC CERTIFICATION ASSOCIATION, A GROUP WHICH IS NOW INACTIVE. NONETHELESS, THE SPIRIT OF THE AGREEMENTS WHICH THESE AFFIDAVITS REPRESENT, LIVES ON. YOU, THE GROWER, MUST READ, UNDERSTAND, AND FOLLOW THE DIRECTIONS OUTLINED IN THE FOLLOWING DOCUMENTS. THESE DOCUMENTS ARE THE ESSENCE OF THE GUARANTEE WHICH YOU PROVIDE TO WE, OAK MANOR FARMS INC., THE BUYERS OF YOUR PRODUCTS. JUST AS WE, OAK MANOR FARMS INC. AGREE TO PROVIDE THE SAME GUARANTEE TO THOSE BUYING ORGANIC PRODUCTS FROM US, AND SO ON.

DOCUMENT COCA-A110

CANADIAN ORGANIC CERTIFICATION ASSOCIATION

As a producer of certified products in accordance with the Canadian Organic Certification Association (hereinafter referred to as The Association) recommendations as set out on the attached form COCA-A100, I/We have examined, understood and subscribe to the organic recommendations for production established by The Association as set out therein.

All products sold by the undersigned producer to The Association or its designated purchasing agent shall meet or exceed Association recommendations for such products, except such products as have been specifically exempted therefrom in writing by The Association.

*Signed, and witnessed this _____ day of _____, 19 _____.

•
• Signature

Witness _____ • of Producer _____

DOCUMENT COCA-A120

CANADIAN ORGANIC CERTIFICATION ASSOCIATION

In consideration of the purchase by The Association or its designated agents from the undersigned producer of certified organic products in accordance with the recommendations as set out on attached form COCA-A100, the producer hereby agrees to save harmless and keep indemnified The Association, its designated agents or buyers therefrom, from and against all claims and demands arising out of or in any way connected with the reliance of such parties on the undertaking of the producer to comply with the above recommendations and from and against all losses, damages, costs, charges and expenses which The Association, its designated agents or buyers therefrom may sustain or incur in consequence of such reliance.

*Signed, and witnessed this _____ day of _____, 19 _____.

•
• Signature

Witness _____ • of Producer _____



OAK MANOR MILLING

R.R. 1, Tavistock, Ontario, Canada N0B 2R0

Throughout our many years of involvement with the organically-grown foods industry we have noticed a number of recurring problems.

We would like to share our experiences with you in order that you become familiar with our expectations, when we agree to buy a few bags, a truckload, or in some cases, your whole crop.

For instance, as a basic starting point we ask that you store and handle the grain in a well-maintained premises which is:

- sealed to the encroachment of sparrows and other birds
 - sealed to rodents and other vermin
 - sealed to the effects of weather
 - sealed to the effects of moisture, condensation, fumes
- } "sealed" still allows for normal ventilation

When we are conducting our announced farm certification visit...

- it must be with your written consent
- after the farm inspection and completion of the paperwork, we (or our designated certifying agent), and you, mutually sign the inspection report OMF - CP - X - 8
- we, or our certifying agent, will specifically state the results, observations and recommendations of the visit at that time

We are often involved in shipping large quantities of grain where we are not ourselves present at the cleaning, elevation, assembly and loading. In these cases we seek very close communication between you and us, and between you and the designated carrier or shipping conveyance. Please...

- cultivate a friendly and principled relationship with your local elevator or cleaning plant, since technically you are introducing a clean, organically-grown, free-of-chemicals product into a potentially contaminated system where they use bin fumigants, poisons, etc.
- at any time with as little as 2 weeks notice we may ask you to load on our behalf a 45-foot trailer, box-car, hopper car, 20 or 40 ft. container
- the trailer (container) must be absolutely clean
- free of rotting material in the corners
- free of protruding nails and/or holes in the floor or walls
- free of evidence of there having been any incompatible substance previously present (caustic soda, etc.) to destroy organic integrity
- if any of these problems exist, you must refuse loading
- remember to draw the samples, placing one in the loaded trailer, and retaining one for your records
- affix either the carrier seal or our certification seal to the trailer door(s), then notify us when the load leaves stating the trailer number.

Lastly, please endeavour to cultivate a harmonious relationship with, and understand the rules of, the Wheat Board, Grain Commission, and your various provincial marketing boards.



GROWER AFFIDAVITS OF GUARANTEE

Telephone: (519) 662-2385

Telex: 069-55290

OAK MANOR MILLING

R.R. 1, Tavistock, Ontario, Canada N0B 2R0

NOTE: THE TWO AFFIDAVITS OUTLINED BELOW WERE EVOLVED BY THE CANADIAN ORGANIC CERTIFICATION ASSOCIATION, A GROUP WHICH IS NOW INACTIVE. NONETHELESS, THE SPIRIT OF THE AGREEMENTS WHICH THESE AFFIDAVITS REPRESENT, LIVES ON. YOU, THE GROWER, MUST READ, UNDERSTAND, AND FOLLOW THE DIRECTIONS OUTLINED IN THE FOLLOWING DOCUMENTS. THESE DOCUMENTS ARE THE ESSENCE OF THE GUARANTEE WHICH YOU PROVIDE TO WE, OAK MANOR FARMS INC., THE BUYERS OF YOUR PRODUCTS, JUST AS WE, OAK MANOR FARMS INC. AGREE TO PROVIDE THE SAME GUARANTEE TO THOSE BUYING ORGANIC PRODUCTS FROM US, AND SO ON.

DOCUMENT COCA-A110
CANADIAN ORGANIC CERTIFICATION ASSOCIATION

As a producer of certified products in accordance with the Canadian Organic Certification Association (hereinafter referred to as The Association) recommendations as set out on the attached form COCA-A100, I/We have examined, understood and subscribe to the organic recommendations for production established by The Association as set out therein.

All products sold by the undersigned producer to The Association or its designated purchasing agent shall meet or exceed Association recommendations for such products, except such products as have been specifically exempted therefrom in writing by The Association.

*Signed, and witnessed this _____ day of _____, 19 _____.

Witness _____

•
• Signature
• of Producer _____

DOCUMENT COCA-A120
CANADIAN ORGANIC CERTIFICATION ASSOCIATION

In consideration of the purchase by The Association or its designated agents from the undersigned producer of certified organic products in accordance with the recommendations as set out on attached form COCA-A100, the producer hereby agrees to save harmless and keep indemnified The Association, its designated agents or buyers therefrom, from and against all claims and demands arising out of or in any way connected with the reliance of such parties on the undertaking of the producer to comply with the above recommendations and from and against all losses, damages, costs, charges and expenses which The Association, its designated agents or buyers therefrom may sustain or incur in consequence of such reliance.

*Signed, and witnessed this _____ day of _____, 19 _____.

Witness _____

•
• Signature
• of Producer _____

DOCUMENT OMF - CP - X - 9
RESIDUE TESTING

Telephone: (519) 662-2385
Telex: 069-55290



OAK MANOR MILLING

R.R. 1, Tavistock, Ontario, Canada N0B 2R0

TODAY'S DATE: _____ DATE SAMPLES SUBMITTED: _____

NAME OF LAB: _____ INSPECTING OFFICER: _____

NUMBER OF SAMPLES SUBMITTED: _____ SAMPLES FROM FARM OF: _____

DETAILED COMMENTS ON EACH SAMPLE TO FOLLOW: THE LAB REPORT WILL BE ATTACHED TO THIS SHEET.

SAMPLE #1: _____

SAMPLE #2: _____

SAMPLE #3: _____

SAMPLE #4: _____

SAMPLE #5: _____

GENERAL OBSERVATIONS: _____

CONCLUSIONS: _____

Canada's Leader In Organically-Grown Grain Products

DOCUMENT OMF - CP - X - 10
SOIL TESTING

Telephone: (519) 662-2385
Telex: 069-55290



OAK MANOR MILLING

R.R. 1, Tavistock, Ontario, Canada N0B 2R0

TODAY'S DATE: _____ DATE SAMPLES SUBMITTED: _____

NAME OF LAB: _____ INSPECTING OFFICER: _____

NUMBER OF SAMPLES SUBMITTED: _____ SAMPLES FROM FARM OF: _____

DETAILED COMMENTS ON EACH SAMPLE TO FOLLOW: THE LAB REPORT WILL BE ATTACHED TO THIS SHEET.

SAMPLE #1: _____

SAMPLE #2: _____

SAMPLE #3: _____

SAMPLE #4: _____

SAMPLE #5: _____

GENERAL OBSERVATIONS: _____

CONCLUSIONS: _____

Canada's Leader In Organically-Grown Grain Products



OAK MANOR MILLING

R.R. 1, Tavistock, Ontario, Canada N0B 2R0

JULY 1982

Foreward: OUR RATING SYSTEM

This rating system is based on regular field inspections (at least one per crop year). In 1982 we introduced this system as a simple means of evaluating farmers' progress. The system is outlined below.

GOLD: This symbol represents an excellent organic farmer. The farmer has good sound crop rotation. Spraying wouldn't enter the person's mind. They would turn their crop under before they would ever spray. A committed grower. No farmer can be given a "gold" rating without a minimum 36 months interaction between them and Oak Manor Farms.



BLUE: The farmer has a rotation (including a legume) but which includes only one or two crops. The farmer never would spray, but is somewhat shy of a 4-year, 5-year or 7-year rotation. We like to see our growers evolve to the "blue" rating in the second year of interaction with them.



RED: This rating is used to designate a farmer from whom we are buying for the first time. Represents a transitional farmer who might still be spraying on some fields, though other of his fields will qualify. In other words, we can only buy from the farmer on certain conditions, such as our being short of crop, etc.



BLACK: This designation represents either an uncertified (as of yet) farmer, or one who is not yet qualified (chemical-free for less than three years), or one who is dis-qualified. Regarding the latter reason, it represents a former grower who moved backwards, or failed to follow our recommendations.



Canada's Leader In Organically-Grown Grain Products

Source: McMullen and Durance 1985.

Appendix H
CONSUMER SURVEY FORM

Respondent No.: _____ Survey No.: _____ Time: _____
Name: _____ Phone No.: _____ Date: _____

Good afternoon, my name is Darrel Harmon and I am doing research at the University of Manitoba sponsored by the Manitoba Vegetable Producers Marketing Board. I would like to ask you a few questions which will help determine if people in Winnipeg would purchase organically grown vegetables in local stores. Would you be willing to spend 5 minutes to participate in this survey?

(If yes, proceed to 1, if not, proceed to next form).

Q.1). Do you regularly purchase fresh vegetables? Y [] N []

Q.2). At which type of outlet do you buy most of your fresh vegetables?

supermarket [] convenience store []
market gardener [] specialty store []
other _____

Q.3). What would be the 5 fresh vegetables you purchase most frequently: _____

Q.4). Do you grow any vegetables yourself? Y [] N []

If yes, which vegetables: _____

Why do you choose to grow your own vegetables?

price [] freshness [] quality [] variety []

other: _____

I would now like to ask you questions specifically about organically grown vegetables. I will begin with a general definition of organic agriculture. Organic agriculture is a production system which enhances soil fertility without using artificial additives, relying on the qualities of the soil to produce healthy plants. The main features are attention to long term production and conservation and no use of chemical herbicides, pesticides and fertilizers.

Q.5). On a scale of 1 to 10, 10 being very important, how would you rate the following factors in affecting your purchases of fresh vegetables:

- A) Appearance: 1 2 3 4 5 6 7 8 9 10
- B) Price: 1 2 3 4 5 6 7 8 9 10
- C) Nutrition: 1 2 3 4 5 6 7 8 9 10
- D) Locally grown: 1 2 3 4 5 6 7 8 9 10
- E) Organically grown: 1 2 3 4 5 6 7 8 9 10

Q.6). Would you purchase organically grown vegetables if available where you shop: Y [] N []

If YES - would you go out of your way to buy organically grown vegetables: Y [] N []
Why would/wouldn't you: _____

Q.7). Would you purchase organically grown vegetables were their price:

lower	-	yes []	no []
the same	-	yes []	no []
higher	-	yes []	no []

if higher, how much more in percent, would you be willing to pay:

% _____ 10 _____ 25 _____ 50 _____ 75 _____ 100 _____

7b). Would factors other than price, such as taste or nutritional content, if shown to be superior in organically grown vegetables, have any affect on your willingness to purchase organic vegetables:

I now need to ask you a few questions about yourself which will not be published or disclosed, but are needed for demographic purposes: Q.8). Sex M [] F []

Q.9). Age: (in groups of 10 years) refused []
under 21 [] 21 - 30 [] 31 - 40 []

41 - 50 [] 51 - 60 [] 61 - 70 [] 70 + []

Q.10). Marital Status: Single [] Married [] other []
refused []

Q.11). No. of persons in household: _____ refused []

Q.12). No. of wage earners: _____ refused []

Q.13). Level of formal education:
high school [] university [] other: _____

Q.14). Annual household income in groups of 10,000:
0- 19,999 [] 20,000- 29,999 [] 30,000- 39,999 []
40,000- 49,999 [] 50,000- 59,999 [] 60,000 + []

Thank you for your time and assistance, if you wish to see the results of this research, please contact the Natural Resources Institute at the University of Manitoba anytime after May 1988.

Appendix I
GROWER INTERVIEW

Name: _____ Location: _____ Date: _____

Type of Farm: Conventional Acreage: _____

Years of farming experience: _____

Crops Grown: _____

Q.1). Are you aware of organic agriculture and how do you feel about it with reference to vegetable production?

Q.2). What factors would determine your willingness to try organic farming methods? _____

Q.3). Do you believe there is a market for organically grown vegetables? Please explain: _____

Appendix J

WHOLESALE AND RETAILER INTERVIEWS

Name: _____ Company: _____ Date: _____

Position: _____ Years Experience: _____

Q.1). Are you familiar with the term organically grown?

Yes [] No [] and what, if anything does it mean to you?

_____.

Q.2). Do you believe there is, or could be, a market for

organically grown vegetables in Winnipeg? Yes [] No []

Why/why not: _____

_____.

Q.3.) What information would you need to be convinced that:

a) a market does exist _____

_____ and:

b) consumers would be willing to pay a premium? _____

_____.

Q.4). If a market was shown to be available, would you be

willing to participate in it, including handling that

would avoid mixing of organic with non-organic stock?

(Including retail displays?) Yes [] No [] Please

explain: _____

_____.

Q.5). Would you require a premium to provide this service,
and if so, how much in % would you need? Why/why not _____

_____.

Q.6). Do you believe consumers would pay that premium? and
why/why not: _____

_____.

Q.7). Are there any factors or concerns we haven't
discussed that you believe are important or would like
to mention? Yes [] No [] _____

_____.

Other Comments: _____

_____.

Thank you for your time and assistance!

Appendix K

INSTITUTIONAL BUYERS INTERVIEW

Name: _____ Co.: _____ Position: _____ Date _____

Type of Business: _____.

Q.1). Where do you purchase the fresh vegetables you use in your food service? _____.

Could you give me an idea of the volume of veg's you use? _____
_____.

Q.2). Are you familiar with the term organically grown and could you explain how you feel about it and why: _____
_____.

Q.3). Do you believe your customers have any preference for organically or conventionally grown vegetables? Y[]N[].

_____.

Q.4). Would you purchase organically grown vegetables were they available? _____

If not, why not: _____
_____.

If yes, why and which ones in particular: _____
_____.

_____,
and what percentage of your total use might they make
up:_____.

Q.5) What affect would price have on your decision? Lower or
higher:_____.

Q.6). What factors, such as appearance, promotional value,
customer satisfaction and acceptance, as well as possible
health benefits, would be important to you in deciding
if organically grown vegetables are something you want
to use in your business? Please explain:_____

_____.

Q.7). Are there any other factors or concerns we haven't
discussed that you believe are important or would like
to mention? Yes [] No [] _____

_____.

Thank you for your time and assistance.

Appendix L
RESTAURANT INTERVIEWS

Name: _____ Company: _____ Date: _____

Position: _____ Years Experience: _____

Q.1). From what sources do you currently purchase your fresh vegetables? _____.

Q.2). What factors are important in your purchases of fresh vegetables? _____
_____.

Q.3). What volume of vegetables do you use? _____
_____.

Q.4). Are you familiar with the term organically grown and what is your reaction to it? Please explain: _____

_____.

Q.5). Do you believe there is a significant difference between org. and conv. produce? How and Why: _____

_____.

Q.6). Would you purchase organically grown vegetables were they made available? and what factors would be most important in considering their use: _____
_____.

If no, please explain: _____
_____.

If yes, why, what kind and how much: _____

_____.

Q.6). Would price be very important to you? _____
_____.

Q.7). Do you believe your customers have any desire for you
to use organically grown vegetables whenever possible?
Why/not: _____
_____.

Q.8). Would you tell your customers if you were using
organically grown vegetables, and do you believe that
they would be more or less satisfied? _____

_____.

Q.9). Are there any factors or concerns we haven't discussed
that you believe are important or would like to
mention: _____

_____.

Thank for your time and assistance!

Appendix M

VEGETABLE GROWERS INTERVIEWED

John Itzke Sr. St. Eustache, MB. Acres Farmed: 500-600 Experience: 38 years Veg. Crops: Cauliflower, Celery G. Cabbage, Cucumber	Lise Remillard St. Leon Gardens, MB. Acres Farmed: 40-60 Experience: 6 + 10 years Veg. Crops: Cabbage, Broccoli Cauliflower
Jim Mosiewich LaSalle, MB. Acres Farmed: 200 Experience: 34 years Veg. Crops: Cauliflower, rutabaga	Scott Giffin Portage La Prairie, MB. Acres Farmed: 125-150 Experience: 4 + 10 years Veg. Crops: G. Pepper, Lettuce G. Beans, Radish
Doug Connery Portage La Prairie, MB. Acres Farmed: 450 Experience: 4 generations Veg. Crops: Asparagus, G. Onion Broccoli, Carrot Cooking Onion Pickling Onion	Dave Jeffries Portage La Prairie, MB. Acres Farmed: 300 Experience: 20+ years Veg. Crops: Carrot, Parsnip Rutabaga, Celery Cucumber, Zucchini

Appendix N
CHEFS INTERVIEWED

Hans Jergen Schweitzer
Executive Chef
Winnipeg Convention Centre
Experience: 20 years

John Reimers
Food Service Instructor/Chef
Red River Community Coll.
Experience: 20 years

Yoshitaka Chubachi
Executive Chef
Royal Crown Restaurant
Experience: 20 years

Scott Ball
Executive Chef
Manitoba Club
Experience: 10 years

Tony Murakami
Executive Chef
St. Charles Country Club
Experience: 25 years

Appendix O

INSTITUTIONAL BUYERS INTERVIEWED

Name: Dave Ash	Name: Jack ?
Company: Dept. of Govt. Svcs. Purchasing Branch	Company: U. of Manitoba
Position: Purchasing Agent	Position: Food Service Mgr.
Business: Prov. Institutions	Business: Univ. Cafeteria
Name: Tony Malyk	Name: Mrs. Walker
Company: Cara - Airline Svcs.	Company: Health Science Centre
Position: Purchasing Manager	Position: Production Manager
Business: Airline Service	Business: Hospital
Name: not given	
Company: Lions Manor	
Position: Food Service Supervisor	
Business: Geriatric hospital	

Appendix P

WHOLESALEERS AND RETAILERS INTERVIEWED

Cal Shaw

Position: Produce Buyer

Experience: 20 years

Company: Western Grocers

Business: Wholesaler for
Super-Valu

Gerry Richards

Position: Produce Mdse. Mgr.

Experience: 30 years +

Company: Scott National

Business: Wholesaler

Paul Giasson

Position: Produce Director
and Buyer

Experience: 20 + years

Company: Codville Co.

Business: Wholesaler

Russ Petrie

Position: Produce Manager
for Superstores

Experience: 34 years

Company: Canadian Superstores
West

Business: Retail Distribution
for Superstores in
Mb., Sk., and Ab.

John Riel

Position: Produce Manager

Experience: lifetime

Company: Mcdonalds Consolid.

Business: Retail Dist. for
Safeway in Man.

Eldon Toews

Position: Produce Buyer

Experience: 30 years

Company: Penner Foods

Business: Retail Dist for
Penner Foods in Man.

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