Profitability and organic farming in the province of Ontario

by

Yasser Ghoreishi

A thesis submitted in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy (PhD)
in Human Studies and Interdisciplinary

The Office of Graduate Studies
Laurentian University
Sudbury, Ontario, Canada

THESIS DEFENCE COMMITTEE/COMITÉ DE SOUTENANCE DE THÈSE
Laurentian Université/Université Laurentienne
Office of Graduate Studies/Bureau des études supérieures

Title of Thesis Titre de la thèse	Profitability and organic farming in the province of Ontario
Name of Candidate Nom du candidat	Ghoreishi, Yasser
Degree Diplôme	Doctor of Philosophy
Department/Program Département/Programme	Human Studies
Date of Defence Date de la soutenance	October 21, 2021

APPROVED/APPROUVÉ

Thesis Examiners/Examinateurs de thèse:

Dr. Raoul Étongué Mayer
(Co-Supervisor/Co-directeur(trice) de thèse)

Dr. Parveen Nangia
(Co-Supervisor/Co-directeur(trice) de thèse)

Dr. Yves Robichaud
(Committee member/Membre du comité)

Dr. Joseph Mensah
(External Examiner/Examinateur externe)

Dr. Darrel Manitowabi
(Internal Examiner/Examinateur interne)

Approved for the Office of Graduate Studies
Approuvé pour le Bureau des études supérieures
Tammy Eger, PhD
Vice-President Research (Office of Graduate Studies)
Vice-rectrice à la recherche (Bureau des études supérieures)
Laurentian University / Université Laurentienne

ACCESSIBILITY CLAUSE AND PERMISSION TO USE

Abstract

This research intends to identify the fundamentals of organic farms' profitability structure in the Province of Ontario with an interdisciplinary focus, which includes small and medium-sized farms that provide organic food directly and indirectly through intermediaries to consumers. Hence, organic farmers need to remain profitable to stay in their non-profit-driven businesses and contribute to environmental sustainability, socially responsible farming and achieve its pro-social and pro-environmental goals. I used a questionnaire; consisting of four sections: company or farm-related information, general socio-economic questions, financial information for three-year periods (2015 – 2017), and environment and public health-related information containing open and closed-ended research questions. First, I sent a hard copy of the questions and then collaborated with the Organic Council of Ontario and used the SurveyMonkey platform to increase the number of participants. My findings show that organic farm products are critical to enhancing the health of Canadians. Additionally, organic farming plays a vital role in protecting the environment by reducing soil erosion and water pollution, among other benefits, thus being critical to national development. It also was established that the government should ensure that the assistance offered to organic farmers reaches each farm and develops financial instruments to support the farmers. My Ph.D. thesis provides researchers with an overview of the profitability of organic agriculture in Ontario to inform future studies. In addition, it offers policymakers vital information applicable in formulating regulations towards boosting organic farming in Canada. Government support likely plays a role in the success of a lower-cost sustainable organic food system. My study established that politicians should ensure that the assistance offered to organic farmers reaches each farm and develops financial instruments to support the farmers financially. Finally, this research will be useful for farmers considering organic food growth, policymakers trying to determine whether organic farmers require subsidies, and scholars who would like to know more about the profitability structure of organic farms.

Keywords: Organic farming, Profitability, Public Health, Environmental safety, Government,

Acknowledgements

First and foremost, the gratification I carry for this thesis is due significantly to the priceless contribution by my supervisor, Dr. Raoul E. Mayer for his extraordinary supervision and valuable suggestions in completion of this research work, without which this work would not have seen the light of the day. My special thanks are due to committee members Dr. Yves Robichaud and Dr. Parveen Nangia that helped me construct my thesis. I would like to acknowledge without any hesitations their unconditional and invaluable assistance. My thanks go to Dr. Pawoumodom Matthias Takouda for his special consultations and supports. I sincerely appreciate all support and guidance of Dr. Simon Laflamme, the director of the Ph.D. program. So many people helped me in completing this work, among them all I should mention Carolyn Young, Executive Director and Dora Chan, Communications & Membership Manager of Organic Council of Ontario (OCO) for the valuable consultation and support. Special thanks to Haydeh Miremadi CPA, CMA for her tireless guidance, ideas, contributions, and moral support during the process of writing this paper.

I am very thankful to my friend Maria Begona for her encouragement and continuous support during the course of my study. I would also wish to extend my recognition to my family for confidence in me and constant assurance contributed to my success. In my heart I am also grateful for the opportunity I have had to present my work at colloquiums/workshops sharing thoughts and ideas along the way with good people who indirectly have contributed to the completion of this thesis.

Table of Contents

List of Tables

List of Figures

List of Appendices

Profitability and organic farming in the province of Ontario

CHAPTER ONE: INTRODUCTION

1.1 Introduction

Profitability does not influence most Canadian farmers who engage in organic farming. According to Rigby and Caceres (2001), profitability affects only nine percent of Canadian organic farmers. Nevertheless, some farmers have concerns such as the health of Canadians, environmental issues, and the satisfaction of producing organic food, which for most consumers are of a better quality. However, Fairweather and Campbell (1996) have established that about a third of organic farmers are likely to switch to conventional farming if the profitability of organic agriculture decreases substantially. Although such shifts differ from one farmer to the other and from one country to another, most of the organic farming products cost relatively more than conventional produce. For instance, most organic products produced in the UK cost between 50 and 100 percent above the traditional farm products. A similar trend, although relatively lower exists in Canada, where some organic farmers are profit driven.

Although profitability should not be the focus in organic farming, Rigby and Caceres link it to the sustainability of the practice. Rigby and Caceres (2001) argue that organic agriculture should maintain its usefulness and productivity among the members of society in the end. In addition, they claim that it should be commercially competitive, specifically profitable, for it to be sustainable. On one hand, sustainability is vital to environmental conservation because it ensures that organic farming adheres to sustainable practices to remain profitable (Rigby and Caceres, 2001). Additionally, it promotes public health by ensuring people consume healthy products. On

the other hand, profitability enhances the economic viability of organic farming, which cannot be downplayed, given the critical role it plays in national development.

Organic farming is linked to various benefits critical to human development and conservation of the environment. According to Reganold and Waltcher (2016), organic agriculture enables people who consume organic products to maintain good health critical in disease prevention. In addition, Reganold and Waltcher (2016) argue that organic farming reduces environmental degradation, especially at this time of heightened global warming concerns. However, Wynen (2008) claims that organic agriculture conserves soil fertility, which is later critical to human development. Padel and Lampkip (2015) assert that organic farming helps preserve higher organic content than contemporary agriculture, which depends mainly on synthetic fertilizers. Gattinger et al. (2012) claim that the organic content retained via organic farming plays an essential role in reducing soil erosion, thus contributing largely to minimizing the rate of water pollution that later threatens human development. Furthermore, organic farming contributes to human development more than conventional agriculture. Benbrook et al. (2008) argue that organic farming helps farmers produce organic products with higher nutritional value than conventional foods. In line with this, most Canadians identify organic products as much better than inorganic produce (Seufert, 2012). Hence, there is the need to ensure that organic farming thrives despite its possible shortcomings.

Organic farming faces a myriad of challenges despite the numerous benefits to humans and the environment. At the outset, most farmers incur huge costs, which discourage them from mechanizing farming practices (William, 2007). Most farming machines used in organic farming are expensive, and farmers require training to use them. Additionally, Zinati (2002) states that organic farmers encounter pests and weeds, but unlike conventional farmers, they do not use

pesticides and herbicides to control the menace, thus lowering their farm output. Cook et al. (2007) state that although there are various methods for fighting pests in organic farming, most of them are time-consuming and require farmers to spend time and money on training. Moreover, most organic farmers lack help in analyzing vital market information because organic farming is widespread and informational intensive, and the majority of people do not understand what to grow at any given time (Scialabba and Hattam, 2002). While the lack of vital information relating to organic farming might be a minor challenge to some organic farmers, it reduces the output of organic farming. As a result, information overload contributes to reduced profits of organic agriculture, thus discouraging current organic farmers from the trade (Bello, 2008). Besides, information overload might discourage potential farmers from pursuing organic farming, despite its significant environmental and health benefits.

Furthermore, it is notable that although most organic farming practices may be subjected to mechanization, the venture tends to be labor-intensive (Yadav and Varadarajan, 2012). As a result, organic farmers, regardless of their sizes, usually incur huge labor costs that reduce their profitability (Strauss, 2015). Additionally, Bello (2008) states that the expenses incurred while transporting organic manure and other farm inputs that organic farmers cannot produce at their farms equally increase the costs of engaging in organic farming. In response to some issues mentioned earlier, the Canadian government, in conjunction with various partners, supports organic farming via research and development. The government provides annual financial resources for research and development and maintains extensive services to different organic farmers groups. Consequently, the government of Canada promotes agricultural related courses in colleges and other higher education institutions so that students can acquire scientific knowledge and knowhow in the area of organic farming.

1.2 Problem Statement

Although the Canadian government has supported organic farming through research and development and educational courses, the venture continues to face several challenges that threaten its future. According to Hill and McRae (1992), the challenges include high labor and operational costs, which exceed expenses in conventional farming by over ten percent, the dilemma of using technology, which tends to be expensive for small-scale farmers, pests, and weeds. Other challenges include the overutilization of resources critical in developing organic farming that burden the venture and render it uneconomically viable for farmers, inability to access vital information, and certification, among others (Pimentel, 1993; Scialabba and Hattam, 2002; Bello, 2008). Although most Canadian farmers engage in organic farming for other reasons than its profitability, they need to certify that their farming practices are profitable in order to pursue pro-social and pro-environmental goals suitable for national development and conservation of the environment. Rigby and Caceres (2001) argue that organic farming needs to be profitable to thrive in the future. Therefore, it is imprudent to presume that Canadian farmers who engage in organic farming business would continue the venture despite making losses. Further analysis shows that organic farms make up 1.2 percent of all farms in the Ontario province (Organic Council of Ontario, 2013). While this might appear as a non-issue on the presumption that organic farmers might have converted to conventional farming over the last seven years, the relatively low number of organic farms in the province have adverse effects on the health of people living in Ontario and Canada (Reganold and Waltcher, 2016). In spite of this, the Organic Council of Ontario (n.d) identifies Ontario as the most critical region to Canadian organic farming. Accordingly, it is highly likely that most Canadians consume few organic produces because they are relatively low, given the small number of organic farms in

Ontario. The implication is that the low number of organic farms in the region has affected the health of Canadians negatively.

The majority of empirical studies conducted in Canada have focused on the benefits of organic farming to human society, particularly the link between people's health and the environment. Accordingly, few of the empirical studies in Canada evaluate the profitability of organic farming. According to Hill and McRae (1992), the absence of such studies impacts the presumption that most Canadian organic farmers engage in organic farming due to reasons other than its profitability. Although such a view might be relatively accurate, the fact remains that the profitability of organic farming is vital in Ontario because it determines its continuity in the future. Accordingly, the current study aimed at understanding the fundamentals of the profitability of organic agriculture in the province of Ontario.

The researcher argued that without profits, it would be impractical for organic farmers to continue the practice despite its health and environmental benefits to Canadian citizens (Pimentel et al., 1999). The researcher selected Ontario because of its size, proximity to ready markets, and its contribution to the Canadian population. A map of organic farming in Ontario is provided below (Figure 1.1). This map illustrates how the organic farms sample distributed in the province of Ontario.

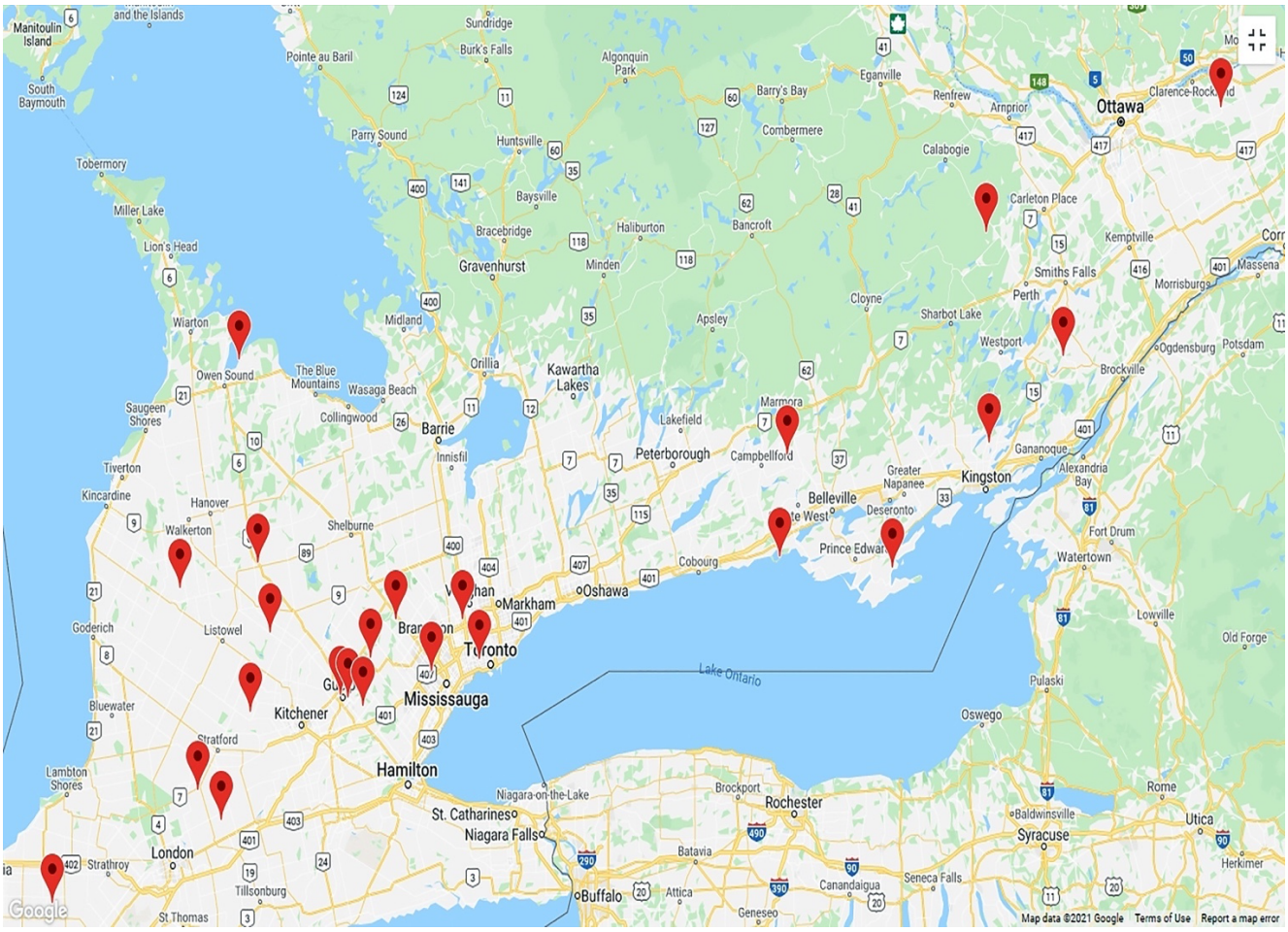


Figure 1.1: A Map of the Distribution of the Organic Farms' Sample in Ontario

1.3 Thesis Focus

The thesis addresses the current problem from three different perspectives, which are vital in organic farming. According to the collected data from the organic farmers about the public health and environment, the first one, looks at how organic agriculture improves the health of Canadians and the negative impact on health due to a reduction in organic products. Although the study does not delve into the issue in-depth, it depicts how organic products improve and protect the health of Canadians. The environmental perspective illustrates the extent to which

conventional farming practices destroy the environment through pollution and excessive use of chemical-based pesticides and herbicides. This aspect highlights the critical role that organic farming plays in conserving the environment through sustainable farming practices. Some of the sustainable farming practices identified throughout the analysis include reduced use of pesticides, and herbicides and organic content usage that minimize soil erosion, among other techniques. The thesis argues that the government should support organic farming because farmers encounter challenges that reduce profitability in maintaining sustainable farming practices. As such, the federal and provincial government should promote organic agriculture to encourage sustainable farming practices. The third perspective, financial and economics, evaluates the profitability of organic farming. The researcher argues that sustainable farming practices should also generate certain levels of profit to sustain the nine percent of farmers who join it for its profitability. Additionally, the study argues that even though the majority of farmers are not be driven by profits, they need funds to meet production costs. The three perspectives contribute to the area of study by depicting the vital roles that organic farming plays in national and human development.

1.4 Research Questions and Objectives

1. What is the profitability of small and medium-sized organic farms in Ontario?
2. How does farm type influence the profitability of organic farming in Ontario?
3. Can large organic farms in Ontario take advantage of economies of scale to expand their profitability contrary to smaller farms?
4. What challenges do organic farmers in Ontario face in accessing sustainable and healthy organic food systems to maximize their socio-economic development?

The presumption was that medium-sized organic farms are relatively profitable than small-sized ones. Accordingly, the researcher expected that medium-sized organic farms in the province of Ontario would be more lucrative than small-sized ones. The general objective is to evaluate how profitability affects organic farming in Ontario. The study formulates recommendations that could enhance the profitability of organic farming in Ontario.

1.5 Significance of the Study

The research not only provides an overview of the profitability of organic farming in Ontario but also offers evidence that help determine the sustainability of organic agriculture in the province of Ontario and Canada. Therefore, the research findings are critical to policymakers in Canada, including farmers intending to venture into organic farming in the future. The study provides the policymakers with data applicable to ensuring increased government support to organic farmers to sustain the business. At this end, farmers are presented with an overview of possible expectations, and measures to enhance the profitability and sustainability of organic farming. In addition, findings are an opportunity to investigate the topic further with possible extension to other areas.

1.6 Assumptions

Given that larger farms are likely to be profitable than smaller ones in overall, the study presumed that profitability does not affect medium organic farms. As such, the study inferred that medium farm are likely to take advantage of economies of scale, thereby capitalize on their high external input and high output production capabilities to increase profitability better than smaller farms. Moreover, the study presumed Canadian government willingness to support

organic farming beyond research and development in addition to the teaching programs developed in higher education institutions. Furthermore, it was also presumed that although most of the farmers were committed to organic farming due to its social and environmental benefits, the practice had to be profitable for sustainability purposes in the future. Therefore, enhancing the sustainability of organic farming could benefit the Canadian government significantly by improving the health of Canadians and protecting the environment.

1.7 Research Organization

The thesis consists of seven chapters, with the first introducing the study by providing background information aimed at justifying the need for the current research, the objectives, and research questions. In addition, chapter one provides background information relating to the problem of profitability in organic farming and assumptions made throughout the research. The second chapter reviews previous studies in the context of the topic. The chapter starts by providing the history of organic farming globally and Canada before highlighting pertinent issues related to the venture. It concludes by identifying research gaps and providing an overview of how the thesis fills the gaps. Chapter three provides the methodology utilized by the researcher to investigate the topic. Specifically, the chapter indicates the research design and philosophy, the target population, and data collection and analysis methods. Chapter four will continue discussing the collected data related to socioeconomic section of organic farms in the province of Ontario. The five chapter presents the study's findings of the related to the organic farm, while the six discusses the results in light of previous studies. Chapter seven finalizes the thesis by summarizing the findings, depicting the extent to which research objectives were attained before describing the recommendations.

1.8 Summery

The introduction chapter provides background information intending to justify the requirements elements throughout the objectives and research questions. It also renders contextual information related to the problem of profitability in organic farming and assumptions created through the study. In addition, the thesis explained the current abstruse from three different perspectives, including public health, environment and financial and economic viewpoints that are vital in organic farming.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter presents a range of existing literature about the broad topic of organic farming. The theoretical framework that underpins organic farms will be discussed in order to develop a clear picture of the foundation of the present study. The present study examines organic farms in Ontario. More precisely, concern was focused on answering the research question: What are the challenges that organic farmers face in accessing sustainable, healthy organic food systems to maximize their socioeconomic development in the fast-growing market of the organic food industry?

As such, the extensive literature review conducted in preparation of this paper involves previous studies, with the view of identifying emergent issues in relation to Canadian organic farming. The aim was to identify the knowledge gap that warranted research, while also assessing data collection requirements for the primary research to be conducted. This chapter is divided into three main sections for the purpose of simplification. First, a detailed history of organic farming is provided, followed by a brief history of the concept in our case study area. Next, interrelated aspects such as socioeconomic development and environmental sustainability are looked into in detail.

2.2 History of organic agriculture

Over the course of most of its history, organic agriculture has undergone myriad changes. Conventional agricultural institutions thought of it as an unscientific way of farming that was

mainly used by subsistence farmers, but never as a suitable way of producing commercial food. People that advocated for organic farming were derided. It was thought as being professional suicide for agronomists.

Organic agriculture began in the early years of the twentieth century, primarily in Europe and in the United States (Dobbs and Pretty, 2004). The pioneers of organic farming embraced a holistic understanding that the health of a nation's people depended primarily on the long-term vitality of its soil (Anon, 2012). Research in organic farming started as early as 1910 (University of California Library, 2016). Among the founding fathers of the organic farming movements and research was Dr. Rudolf Steiner who, in 1924, gave various lectures on the important principles of biodynamic farming. In 1939, Lady Eve Balfour of England conducted her ground- breaking experiment, which compared organic foods with those from conventional farms. In the following year, British agronomist Lord North Bourne distributed a publication that defined farmlands as organisms and talked about embracing better ecologically balanced farming practices. He was among the first, to use the word organic, when referring to an agricultural farming system (University of California Library, 2016).

Another pioneer of the organic movement was Sir Albert Howard (1873-1947) a British scientist and advocate for reliable agricultural systems. He promoted the use of green manure and agricultural farming methods such as crop rotation in farming and conservation of agricultural land (University of California Library, 2016). Such pioneers were greatly motivated by the strong desire to avert perennial agricultural problems such as soil depletion, decline in crop variety, soil erosion, low quality food, as well as address rural poverty that was rampant in that age (Kuepper, 2010).

William (2007) argues that it is not easy to determine exactly when organic agriculture started. He claims that early landmarks such as the founding of biodynamic agriculture in 1920, the formation of strong organized movements in the U.K. and the annunciation of the first organic production standards in the 1960s, marked the start of the organic farming movement. It grew in leaps and bounds without much support from institutional and political arenas. The sector is now growing, not only economically but also socio-culturally.

Escobar and Hue, (2007) find that there has been recent turn around for organic agriculture and organic consumption and acreage has seen a steady growth rate that not only demands respect, but also evinces a growing need for research and educational services from individuals and also state corporations and state agricultural departments. According to the United Stated Department of Agriculture, Economic Research Service (USDA, ERS, 2014), organic acreage now surpasses four million; the U.S has the fifth largest amount of acreage in organic production after Australia, China, Argentina, and Italy. Canada is ranked at 15th of the seventeen peer countries that have the largest land in hectares dedicated to organic farming (The Conference Board of Canada, 2008). Refer to below table 2.1, in other parts of the world, a few selected countries in Central and Northern Europe, there was an increase in the total area of land under organic farming in Europe with Croatia topping the list with a 23% increase between the years 2013 and 2014 (Tuck et. al., 2014).

EU	Organic area (ha) 2013	2014	Change 2013-2014 %
Belgium	62,471	66,704	6.8
Croatia	40,660	50,054	23.1
Estonia	151,164	155,560	2.9
Spain	1,610,129	1,710,475	6.2
Germany	1,008,926	1,033,807	2.5
France	1,060,755	1,118,845	5.4
United Kingdom	558,718	521,475	-6.7

Table 2.1: The total area that is fully converted into organic farms and under conversion for a few selected countries in Central and Northern the EU in the year 2013-2014 (*Agriculture, forestry, and fishery statistics, 2015 edition).*

2.3 Brief history of organic farming in Canada

In Canada, the organic agriculture movement started in the 1950s, largely influenced by the distribution of literature and other written material from Europe (Hill and MacRae, 1992). The Canadian Organic Soil Association, which was later renamed the Land Fellowship, was initiated by Christopher Chapman between the years 1950 and 1953. By the 1970s, organic farming was being practiced in six provinces in Canada (Science Council of Canada, 2006).

Canadian organic farming has actually shown a high growth rate due to organizations such as the Canadian Organic Growers (COG). Since 1992, this organization has managed to track the growth and development in organic farms using information obtained from certified bodies. This was characterized with respect to increased weed pressure as well as dependency on non-chemical methods to control the weeds (Organic Council of Ontario, 2013).

By the 1980s, surveys for organic farmlands had already begun and several certification centers were established (Agriculture Canada, 2009). The Canadian government started allocating funds for organic research and publishing literature on organic farming. The education system was also changed in that organic farming courses were introduced in institutions of higher learning.

After the number of organic producers nearly tripled between the early 1990's through 1999, as of the year 2000, the number has plateaued. Subsequently in 2003, Canada had only 3,100 organic farmers with a farming area of approximately 390,000 ha with the main field crops being buckwheat, barley, and wheat. Below is a diagram showing the Certified Organic Farms in Canada in 2001 (Figure 2.1).

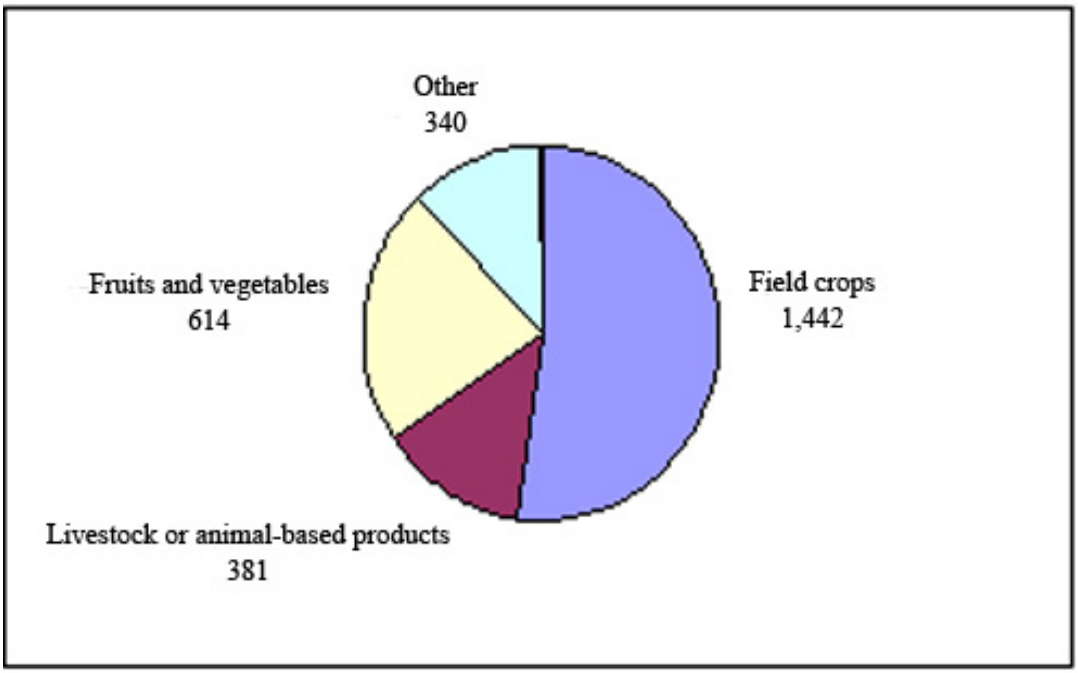


Figure2.1: Certified Organic Farms in Canada in 2001 (*Forge, 2004*).

As Northbourne (1940), reports soil's health and vitality were believed to be in its biology and in soils organic fraction called the humus. Humus farming, which was a type of soil management

strategy emerged using traditional farming practices that helped in soil conservation and soil regeneration. These practices were adopted from European and Asian models that included application of animal manure, green manure, crop rotation, composting, and planting of perennial crops among other Potential Hydrogen (PH) management practices (Organic Farming Research Foundation, 2012).

This strategy revolved around nourishing crops through soil building, which later became the humus farming maxim. Humus farmers generally avoided the use of synthetic fertilizers in their farming practices, which they felt led to an imbalance in plant nutrition (Kuepper, 2010). Humus farmers, however, still recognized that synthetic fertilizers led to shortcuts in crop rotation and eliminated much of the benefits that good rotation offers to crops. Humus farming seeks to manage the soil. It embraces the commitment to substantially avoiding wasteful natural resource exploitation (Jones, 2010). This was in sharp contrast of the agricultural systems in place since the early 1930s.

2.3.1 How Humus farming became organic farming

The term humus farming emerged in the 1940s and the words 'organic farming' were adopted (Northbourne, 1940). Northbourne characterizes organic farming as farming practices that build on soil quality, maintaining water quality and generally have the potential to mitigate global climate changes, while at the same time, supporting an economy. He adds that organic farming consists of a comprehensive set of practices that provides soil benefits as well as providing fiber, food, and feed.

2.4 Organic farming in the Province of Ontario

In Ontario, organic farms make up 1.2% of all the farms in the province but constitute 18% of all the certified farms in Canada (Organic Council of Ontario, 2013). Further, there are 123,328 acres of land that are certified for organic production and about 5,732 acres of land that are under transition, while 11,632 acres are in the organic wild lands (land that has not been cultivated) as shown in the table 2.2 below.

	Eastern	Central/ Metro	Western	Northern	Ontario Total
Certified	31,641	11,518	76,761	3,408	123,328
Transitional	735	425	4235	337	5,732
Wild land	5,066	1,150	4,975	441	11,632

Table 2.2 - Area of land (Acres) under certification/transition in Ontario (Schumilas, 2012).

As per the Organic Council of Ontario (n.d), producers in Ontario are the most dedicated stakeholders in organic farming. In fact, 50% of them have been certified for over ten years. Government projects and organic agricultural movements have been major contributors in the EU, showing great support for agricultural activities, and illustrating many goals for organic farming and agricultural policy. To illustrate the recent advances in agricultural research and development. Other European Union policies such an encouraging innovation in organic farming, investment in better infrastructure and technology that promotes agriculture, (Stolze and Lampkin, 2009). Despite of, there was a concomitant decrease in the area under conversion to organic farming in the United Kingdom.

According to Kendal (2014) as more and more farmers adopt organic farming, and farm outputs increase, there is a considerable decrease in the income generated from the produce. Large farms can withstand lower margins of profits with greater ease if the market forces them to sell their products at a lower price, unlike the smaller farms.

2.5 Enduring ideas about organic agriculture

In line with research conducted by the United States Department of Agriculture (USDA, 2014), seven out of ten people believe that organically grown foods are more nutritious and healthier as compared to those that are grown using synthetic fertilizers. The other commonly held belief is that the organic crops resist pests more naturally. In Rana's (2013) findings, these beliefs are very controversial, if keenly analyzed. As to whether organic foods are healthier, this is a belief that has driven the growth in sales of products in the organic food markets. According to the USDA (2014), the 'healthfulness' of the foods is what convinces many people into buying organic foods.

Organic movement pioneers believed that healthy people always produce healthy food and in return, healthy people bring about a healthy society (Kuepper 2010). Foods mainly originate from the soil, and they naturally promoted a method of growth that was based on soil health. The farms, on which food is grown, should have a biological completeness that serves as a living entity and must, within itself, have a balanced organic life.

Dangour et al. (2009) determined that organic foods are produced according to certain standards that limit the use of chemicals in crop production, thus bringing about a nutrient composition that is of a superior quality than those that are produced using synthetic fertilizers and chemicals. In a

time when people are wary of poisonous chemicals that are used in food production, more and more individuals are opting to go the organic food way, arguing that there are no bioaccumulations experienced in these foods. The USDA statistics show that there has been an increase in the sale of organic products in the US, as shown in the diagram 2.2 below.

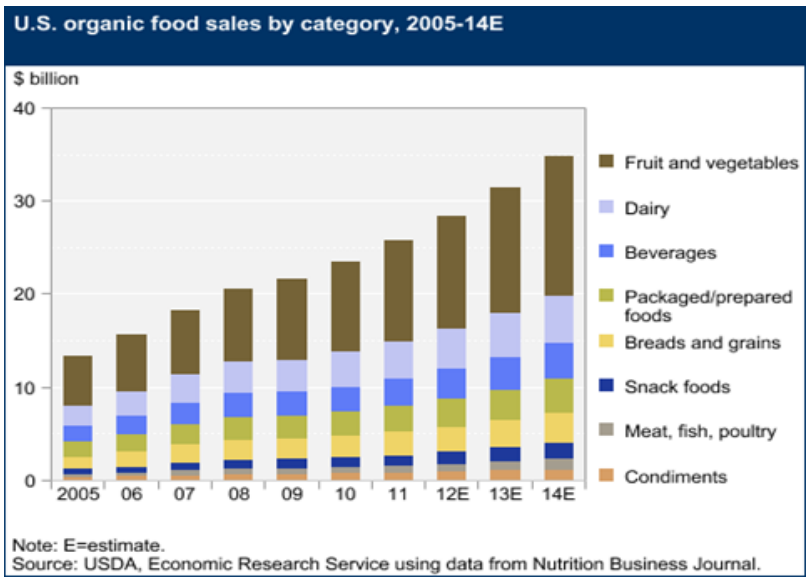


Figure 2.2: U.S. Organic Food Sales by Category (USDA, 2016)

By the year 2014, the annual growth rate for organic foods is represented in figure 2.3 below.

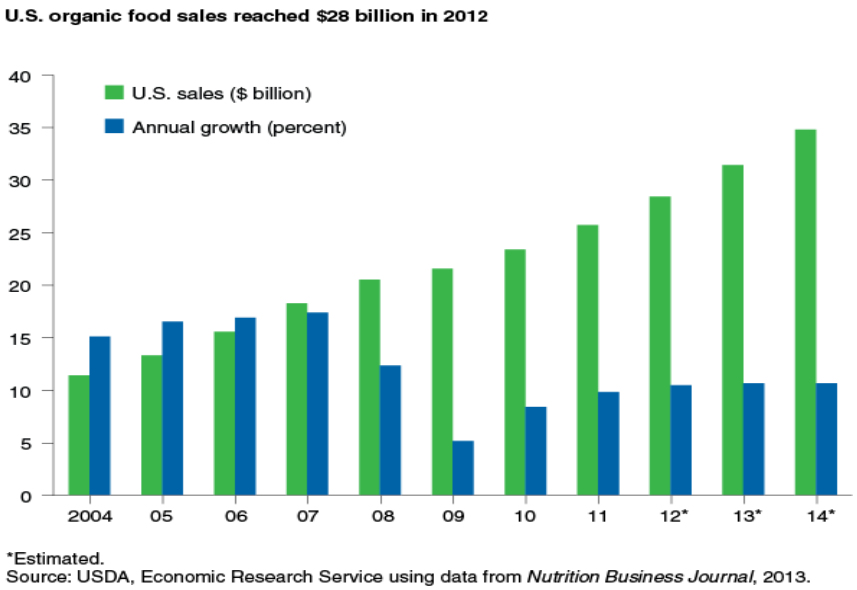


Figure 2.3 - U.S. Annual Growth Rate Sales of Organic Food 2014 (USDA, 2014)

In line with a report by the Department for Environment, Food and Rural Affairs (2002), the price of most agricultural commodities has fallen far below the 50% mark and farmers around the world are not getting fair prices for their commodities, thus they end up going out of business (Department for Environment, Food, and Rural Affairs, DEFRA, 2002). Another consequence of this price drop is that there is a declining workforce in the agricultural sector. Statistics by Wynen (2008) indicate that the small and medium sized farms are disappearing while the large farms continue to increase in number.

In research done by Seccombe (2007), it was found that Ontario is blessed with 53% of the best farmlands in the whole of Canada. The climatic condition in Ontario favours organic farming, moreover, Ontario borders huge urban markets where the products are sold at good prices and there is plenty of labour. Further, there are always new immigrants that are settling in Ontario, who are rich in agricultural knowledge. These immigrant groups are keen on growing foods and providing labour to the agricultural lands. However, despite the increase in labour available in

the organic farms, the demand for the products far outstrips availability (Edge, 2013). According to Macey (2013), an estimated 80% of all the organic products in Ontario are imported from neighboring country, USA.

According to Michael Hart (2001), chair of the Small and Family Farms Alliance, small farms are inefficient and thus, do not receive any significant support. The productivity of small farms is lower, compared to that of medium and large ones. Large farms also yield the highest production. He adds that although the small farms are better users of natural resources, and contribute to local community growth, thousands of the small farmers are forced off their land each year in a move to improve the efficiency of UK agriculture (OECD, 2003). Small scale farmers are in a situation where they have to 'get big or get out' of the farming industry, in order for them to take advantage of the economies of scale that are associated with large scale farming such as increased efficiency, and low costs of production. According to Macey (2013), operations in the organic farms reflect the bioregional diversity that cuts across the country in the same manner that the conventional farming practices do. She states further that in Canada, the majority of organic farms produce pulses and grains mainly exist in Ontario and Quebec. In the year 2009, there were about 85 CSAs on the certified organic farms in Canada.

The sale of certified organic foods in Ontario occurs through a variety of ways. According to a report by Macey (2013), the distribution and sale of organic products in Ontario alone has increased by 20%. A report by the Canada Organic Trade Association (2013) indicates that Canada's organic market in general grew to 3.7 billion in the year 2012. The report also indicates that the organic market has outdone the growth rate of conventional products in the country with more than 55% of Canadians buying organic products weekly.

The diverse consumer base is what is mainly drives the growth of the organic food market (Canada Organic Trade Association 2013). The rate of purchase is high among the native Canadians and highest in households that have young families. Most Canadians, in general, consider organic foods healthier, more nutritious and ecologically sustainable. In the organic products sold in the year 2014, organic beverages and dairy products in Canada enjoyed the highest rates of growth in the retail markets.

In 2012, the organic market in Ontario alone worth more than $1billion as indicated in the graph below (Figure 2.4). According to the Organic Council of Ontario (2012), more food that is organic is sold in Ontario grocery stores than in any other province in Canada. Since the year 2006, the organic market has been on an increasing trend, hitting the 1billion mark in 2011 as shown. Actually, Stakeholders in Ontario expect to have continued organic market growth.

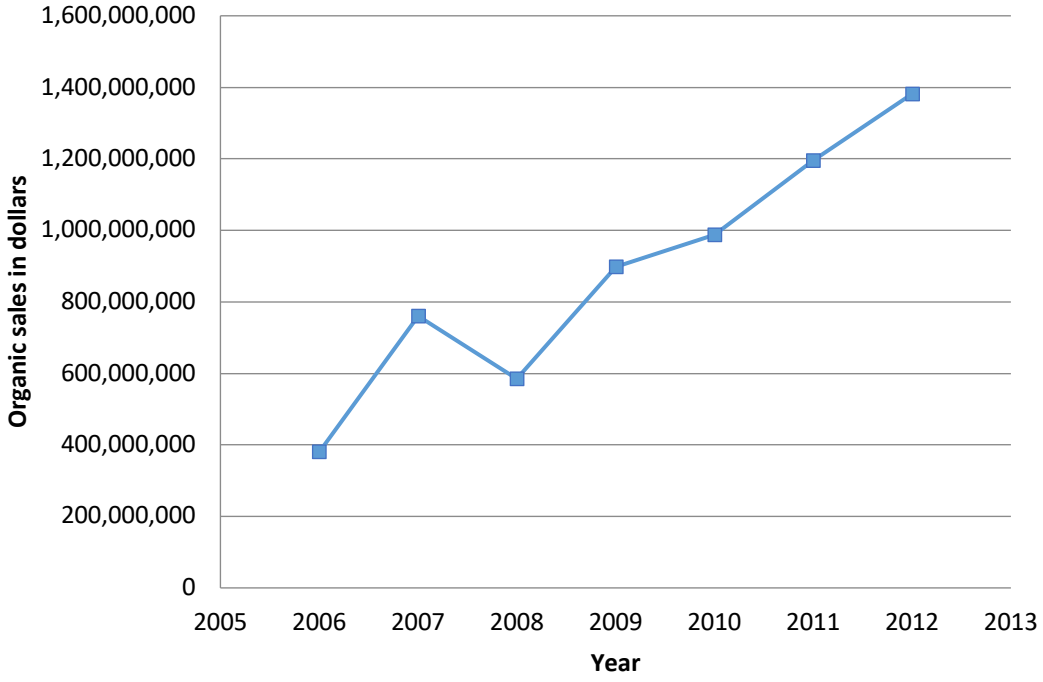


Figure 2.4 - Ontario Organic Market Growth, (Organic Council of Ontario, 2012)

2.6 Benefits of organic farming

Reganold and Waltcher (2016) examined organic farming in the 21st century and found evidence that organic farming holds many benefits for individuals and other sectors of the society. To individuals, organic foods –that are free from chemicals can help them maintain good health. Eating foods rich in nutrients, helps prevent diseases, which is cheaper than treating diseases. In the wake of global warming, people are more committed to reduce their carbon footprint and its impact on the environment by eating more foods that are produced in an environmentally friendly manner, thus contribute to environmental conservation.

2.7 Environmental issues

When it comes to environmental issues, organic farming performs better than the conventional farming in regard to conservation of biodiversity in the number of species, habitats, and landscapes (Wynen, 2008). Conservation of soil fertility and the stability of the system are made easier by the availability of organic matter in the soil. According to Padel and Lampkip (2015), soil that utilize organic fertilizers have more than 7% higher organic content as compared to those that use synthetic fertilizers. The organic material applied to crops in organic farming creates a cover that reduces the rate of soil erosion. Further, topsoils in organically managed soils have higher concentrations of Carbon per ha (Gattinger et.al, 2012).

Absence of synthetic herbicides and chemicals has positive effects on surface and ground water. Ground and surface water pollution is reduced in organic farms since there are no pesticides used and offers a first choice when water resource reclamation needs to be accomplished (Lamers, Anyusheva, Nguyen and Streck, 2011). Organic farming reduced the total greenhouse gas

emissions by a significant percentage. Although it is, a challenge to calculate the amount of emissions reduced into the air, recent studies have documented that the total amount of gases released from organic managed soils is lower than in those where synthetic fertilizers are used (Jeyaratnam, 2007).

According to Scialabb and Hattam (2002), investors also benefit from organic food farming, owing to its steady growth in the recent past. More and more people are investing in organic farming as the demand for produce goes up in the current economic crisis; the organic food industry has surpassed the conventional food industry in other word the rate of growth in organic food industry is faster than conventional food industry as whole. According to Shepherd et al., (2013), there is a very positive effect of organic farming on wildlife conservation. Further, the organic farming practices operate on low nitrogen component meaning that there is little that leaches down to ground water and little that can affect the animals (Rotz, 2004).

2.8 Health issues

As Benbrook, Zhao, Yanez, Davies, and Andrews (2008) detail, organic farming practices are important for human health, the environment, and economic prosperity and for slowing down climate change. Additionally, Benbrook et al, (2008) states that the nutritional value of organic foods is higher than in conventional foods. Healthy soils that are promoted by organic farming are the basis of the development of healthy people and a healthy nation. Public concerns over food quality have heightened research in this area. Food scares and the current controversy targeting genetically modified foods have prompted debate about the safety of the foods that we eat (Holden, 2004). It is against this background that the demand for organically produced foods has risen.

Research conducted by Seufert (2012), shows that a significant number of organic food consumers, which they stated as 58% of all Canadians, have a notion that organic food, is better in terms of quality as compared to non-organic foods. However, this notion is largely based on intuition as opposed to conclusive survey. This is because the quality of food can be defined in various ways. For instance, through the visual characteristics of the food at hand, for example the shape, size, color and little or no blemishes. The visual characteristics of a product can be enhanced using pesticides and fungicides, which many people do not understand. While many people believe that the use of pesticides is important in protecting the plants from pests, it is a well-known fact that exposure to the toxins found in the pesticides has a long-term effect on people's health (Organic Farming Research Foundation, 2012).

2.9 Food productivity

Farming practices often influence the food produced in terms of quantity and quality. According to the Secretariat of the Pacific Community (2009), the content level of each individual substance or the entirety of the selected ingredients generally assesses the quality of food. With regard to nutrition, these ingredients encompass two categories; one is the positive substances, for instance minerals, vitamins and healthy fatty acids. Secondly, is the negative rated substance such as pesticides and the residual heavy metals? Food quantity is mainly determined through the yields produced each season (Seufert, Foley and Ramankutty, 2012). Yield differences are dependent on the farming systems, soil management practices and the types of crops that are grown on that particular piece of land (De Ponti, Rijk and Van, 2012).

As Padel (2015) notes, food productivity effects of the organic farming, practices, may be measured by quantitative and qualitative approaches and were analyzed using several meta data

analysis. Seufert et. al. (2012), states that when comparing the organic and conventional milk for proteins and other healthy acids, organic milk tends to have more protein. However, according to Smith – Spangler (2012), of the literature reviewed, it does not provide any evidence that organic foods are more significantly nutritious as compared to conventional foods. Baranski et al. (2014) claims that conventionally grown cereals have a higher protein level as compared to the organically grown cereals.

In contrast, Padel (2015) claims that the results of a research conducted on 500 organic wheat samples in the years 2010 and 2013, proving that the gluten content, important in the production of bread seemed to be very high, although there was a tendency to fluctuate. Variations in weather conditions were noted to have more negative effects on the stability of the gluten found in the organically grown wheat as compared to the conventional type. Vitamin C content was found to be favorable in organic vegetables and fruits (Brandt et. al., 2011). Other researchers found the vitamins A, C, and E content were equal in both the conventional and organic produce of fruits, and vegetables (Baranski et. al. 2014; Smith- Spangler et. al. 2012).

When considering Phyto-chemicals such as phenol and antioxidants for cereals, fruits and vegetables, and the healthy fatty acids in milk products, organic products were more favorable than the conventional products (Hughner et al., 2007). According to a study conducted by Benbrook et. al. (2008), organic food has higher levels of antioxidant capacity and the polyphenols. What are you saying? All of which are very significant in nutrition. Additionally, Benbrook and others conducted further research to test the total content of phenolic in berries and corn and the result was that organic foods had higher contents of the total phenolic as compared to the conventionally planted crops. Phenolic helps the plants to better defend against pests and diseases. In humans, their high antioxidants levels have a range of pharmaceutical

properties that help in fighting diseases such as cancers and help in the inhibition of platelet aggregation activity.

In milk production, dairy products from animals raised in organic farms seem healthier compared to those produced in conventional farms (Sundrum, 2001). According to a study conducted by (Vicini, 2008), milk that was labeled 'rbST free' (Bovine Somatropin) was of higher nutritional value than regular milk.

2.10 Reducing pesticide

The use of synthetic pesticides has been on the increase in the United States since the 1950s (USDA, 2014). Despite the increased use of pesticides in farming, crop production has been on a downward trend due to pest attacks that wipe out acres and acres of farm produce. The increase in the crop yield can be explained due to various factors such as pesticide resistance, outbreak of secondary pests, planting of vulnerable varieties of crops, as well as growing crops in areas where they are susceptible to pest attacks (Knutson et al., 2012).

To measure the amount of money used in pesticide treatment, and the amount of money lost because of crop failure Pimentel (2011) and his colleagues from Cornell University interviewed the Department of Agriculture (USDA 1998) for data on the current losses in crops (Pimentel, Lach, Zuniga and Morrison, 1999). They also reviewed crop loss data from experiments and had consultations with the pest control specialist. After analyzing the available biological, cultural, and environmental strategies for pest control, noting that the use of herbicides, pesticides, and fungicides could possibly be reduced without necessarily reducing the yield of crops.

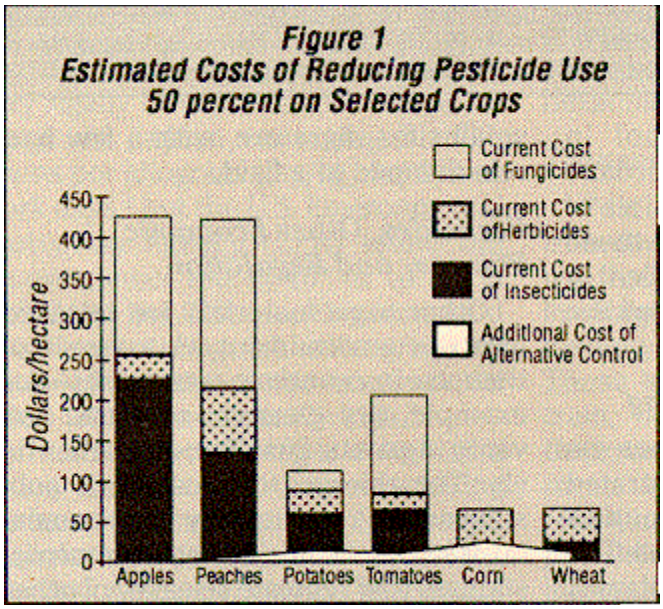


Figure 2.5: Estimated costs of reducing pesticide use (Brenner, 2016)

From the above figure 2.5, reducing the cost of pesticides had an equal to greater impact for crop yielded (Pimentel et al, 2011). The increase in the food production costs that arises from the use of alternative pest control methods would be more effective in that it would reduce the indirect costs that accrues as a result of the environmental degradation, health risks, human poisoning by the pesticides, and government regulations. The approximate costs of the social and environmental implications of the use of pesticides in the U.S. alone stand at eight billion dollars annually (Peterson, 2001). These include the cost of medication for people suffering from illnesses caused by exposure to pesticides.

In Canada, more than 87% of respondents in a survey conducted by Macey (2013) were concerned with the chemical residues found in foods. They were also concerned that the environment was being exposed to dangerous toxins that would degrade it. As such, the respondents were willing to buy organically produced foods to improve their health and at the

same time, conserve the environment. According to Edge (2013), since the embrace of organic farming in Ontario Canada, pesticide use has reduced by up to 32% in the last five years. There have been concerns in the past that there are traces of pesticides in the organic foods in Ontario. This was a result of water contamination and cross-pollination from neighboring farms and uncertified farmers.

The current use of pesticides in Canada can be traced in water surfaces, air precipitates and in some foods. The Canadian government has tried to regulate the use of pesticides through the Pest Management Regulatory Agency. However, despite the regulations imposed many farmers use pesticides in their farming activities. This can be attributed to the shortcuts that pesticide uses in food production. According to research conducted by the Water, Science and Technology Directorate Environment Canada (2011), continuous use of the pesticides in Canada has adverse health implications and, with time, can cause bioaccumulation in the food chain that would alter the system. Many farmers and Canadians who are concerned about environmental degradation and their health have favored embracing organic farming. Further, the Directorate of Environment in Canada (2011), reported that in Ontario alone, herbicide use was in excess of 79% a decade ago, which could be attributed to the growing populations and increased demand for food. This use has however been on the decline, thanks to the shift to organic farming.

2.11 Organic agriculture reduces pesticide use

Integrated pest management (IPM) has long been used to reduce the cost associated with pest control, particularly in fruits and vegetables as seen in figure V. The IPM facilitated ease of monitoring the pests and any injuries in the crops was used to promote the need for pest suppression treatments (Stolze, Piorr, Härring and Dabbert, 2000). Reduction of the pests and the

costs associated with pest management can be reduced by introduction of natural enemies in farms, as is the norm in organic farms in Ontario. The organic farms do not need any pesticides, as the farmers have learned to use the natural enemies to fight against the pests. Jules Pretty (2011), discovered that on average there is 79 percent increase in crop yields over preceding agriculture systems when the farms used pest predators compare to those farms did not habit. As Graham Salinger (n.d) cited in his blog, by introducing some predacious insects such as ladybugs or mites into farms in order to destroy other pests. For example, in Thailand, farmers with the aim of killing mealybug, the farmers are using tiny wasp and in Florida, farmers are cultivating plants to entice swaps to place their eggs in the grubs, to avoid rebreeding of detrimental pests. Learning the mating patterns of the pests has been instrumental for farmers in the organic farms in keeping these pests at bay (Prokopy, 2000).

2.12 Local community organic farming

According to Bruch and Ernst (2010), Community Supported Agriculture (CSA) mainly consists of people that make a pledge to support a farm's operations so that the farmlands become the communities, where the growers and the consumers show equal support. At the same time, all share in the risks and benefits involved in food production. The members agree to meet the costs of production beforehand, including the farmer's salary (Bruch and Ernst, 2010). These CSA initiatives provide fresh produce that is grown organically.

There are two types of CSAs, the subscription CSA, and the shareholder CSA (Bruch and Ernst, 2010). The subscription CSAs are farmer driven, where the farmer arranges the CSA recruit customers or members that he later works with, to produce and market his product. On the other hand, shareholder CSAs are more customers driven. The customers organize the CSA and hire a

farmer who grows the food for them. The community or shareholders pay the farmer a salary, while they benefit from the fresh products. The consumers can pay an additional fee for extra products if they so desire. Community Supported Agriculture has gained popularity in the recent past as a good marketing channel for organic products. Although market potential is on the increase, CSAs do not favor all farmers/producers. Thus, producers who want to be successful should consider several factors.

- The quality of the product that they are offering
- The variety produced throughout the season
- Determining the marketing strategies required and the marketing skills are possessed
- Loyalty of members
- Production experience

According to Edge (2013), more and more Canadian consumers desire to buy their products directly from the CSA farms in the belief that they are supporting their local economies. They also believe that the foods from the local farms are fresher and more pocket friendly. Actions of the government, industry and the consumers shape the role of the CSA in the broader agricultural sector (Edge, 2013). As Macey (2013) notes, the viability and size of the CSA farms in Ontario, Canada are dependent on the demand for organic foods in most parts of the province. A study by the International Federation of Organic Agriculture Movements (2013) showed that the Canadian government has made an effort to encourage the development of more CSAs that enhance population growth and food security.

2.13 Organic food growth and producer profits in the CSA farms

The production and sale of organic foods has grown exponentially in the United States in the past decades (Hill and McRae, 2012). Although organic farms in the U.S. stands at about 2% of all the agricultural land, the perception that organic foods have both health and environmental benefits has led to a skyrocketing demand for the products among people of all ages (Hill, 2005). Organic foods producers have heeded this call. They are now producing and selling their produce after certification.

In Krystallis and Chryssohoidis, (2005) findings, worldwide, most consumers are willing to pay more for foods that has been organically produced. The availability of funds for conversion into organic farming in Europe has led to an increase in the number of people who convert from conventional farming to organic farming in the U.K. as compared to the U.S. (USDA, 2014).

In the U.S. however, the United States Department of Agriculture is actively involved in the organic farming sector (Koenig and Baker, 2016). Thomas and Kennan (2003) report that organic farming systems put a lot of emphasis on better soil management practices and crop management. Prices for the organic food products are always higher than that of the conventional products. However, despite the high-cost surveys conducted by the USDA, it has been found that more than one third of the buyers tend to buy organic foods (USDA, 2014)

Edge (2013) observes that the Canadian local and provincial governments have promoted CSAs through continuous marketing of the benefits of organic foods and engaging locals and farmers in Agri-tourism initiatives. As said by Seufert (2012), Canadian consumers are willing to pay in excess of 15 - 20% of organic products as compared to the conventional foods. According to a study done by the Organic Council of Ontario (2012), the largest number of stakeholders in the CSA farms earn lower prices when selling locally, unlike those stakeholders who venture further

away. The cost of organic foods rises higher than the conventional foods due to the high costs of production, storage, and distribution. Intense labor inputs also contribute to the high price of the commodity (IFOAM, 2013).

2.14 Economic principle of growth in the demand for organic food

There are various causes or determinants for consumer demand. More specifically, are the reasons why consumers would opt to buy a product when there is a cheaper alternative. Every buyer has their own reasons as to why they prefer a certain product to another and the reasons could range from psychological to cultural, budget limitations and even snap purchasing decisions. At the market level, however, social scientists have been able to isolate the different forces that drive the consumer's purchasing preferences in the market. In particularly, the motivation behind the consumer's purchasing preference for organic foods is summarized below:

$Q_d = f(P, M, P_r, T,)$, where:

Q_d = quantity demanded of organic food in (kg)

P = price of the organic food ($/kg)

M = per capita income ($/year)

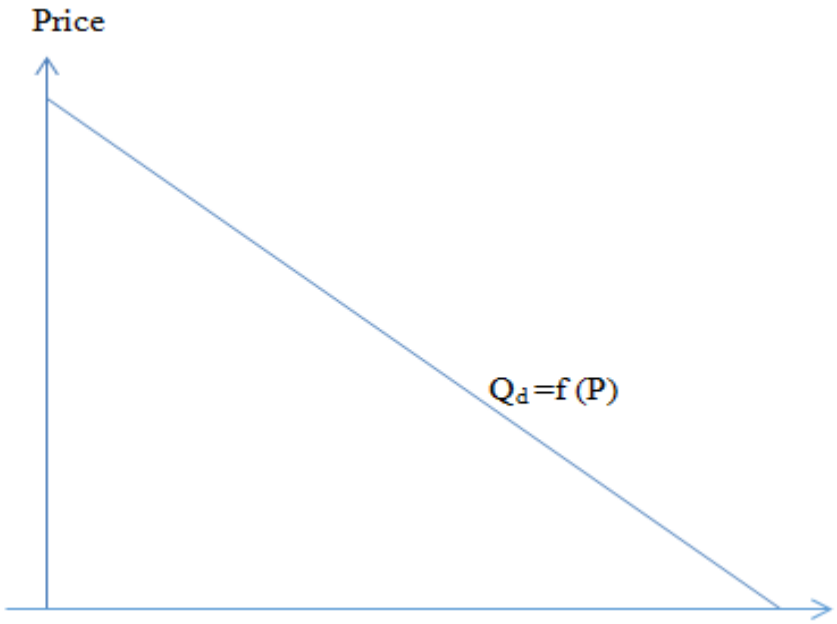
P_r = price of "related" or alternative goods ($/kg)

T = consumer tastes and preferences

In the above equation, the quantity of organic foods that are purchased (Q_d) is directly related to the variables (P, M, P_r, T). Each of these variables is discussed below.

2.14.1 Price (P)

The law of demand states that when the price of goods is high then the quantity demanded decreases. This is illustrated in the figure 2.6 below:



Q_d = Organic food purchases/ demanded (kg)

Figure 2.6: Relationship between the demand for organic foods and price.
(Source: Minnesota State University, 2016)

As shown in the figure 6 above, any changes in the price of the organic commodities will have an impact on the quantity of the organic goods demanded or purchased. As Hegeman (2002), observes it is also true that any decrease in the costs associated with production, certification, or marketing, will result in a reduction in the retail price of the commodities; thus, foods that are organic will be demanded. Rapid technological changes will decrease the retail prices for the organic commodities, since the technology will allow for large quantity production at lower prices.

There are certain groups of consumers, however, who do not alter their purchasing trends for organic foods, despite the increase in prices. There are two reasons why this happens. One is the strong conviction that organic food is superior and offers more health benefits and the second one is the high income that this group of consumers earns (Diebel, Williams and Llewelyn, 2005).

2.14.2 Income (M)

An individual's income determines one's purchasing power. An increase in the income of an individual does not necessarily signify an increase in the amount spent on foodstuff (Dobbs, 2012). Rather, the amount spent on food decreases as income increases since most, if not all, consumers diversify their purchasing power beyond the necessities. This impression is described in the figure 2.7 below, which shows that purchases of food increases as the income of a person increases, but at a rate that is decreasing. At a certain time, consumers have enough food to eat and thus their extra income is directed to other activities besides consuming food.

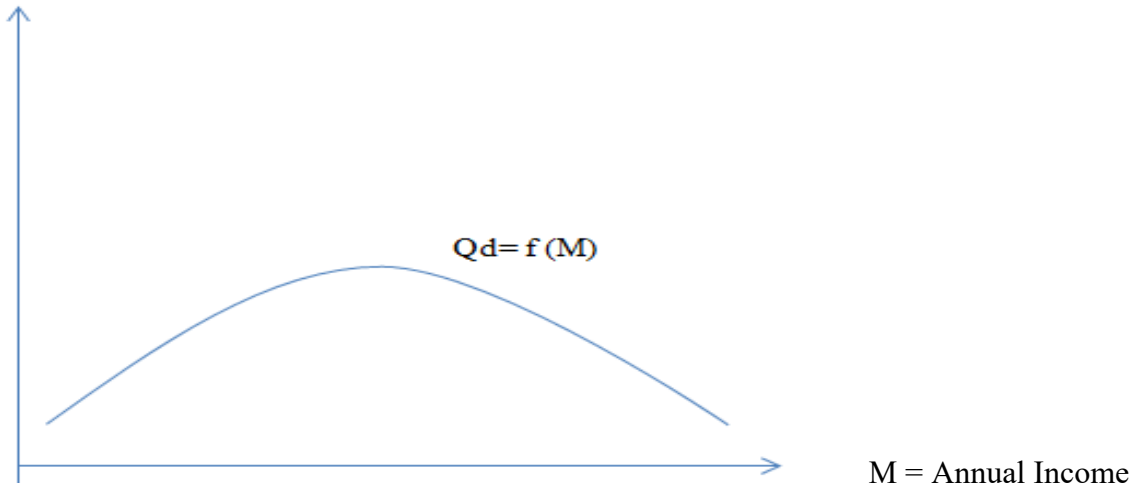


Figure 2.7: Relationship between income earned and the demand for food (necessity).
(Source: Authors Research)

The demand for necessity food appears as shown above. However, as the standard of living improves/increases consumers' purchasing power shifts to high quality foods such as the organic foods see figure 2.8 below.

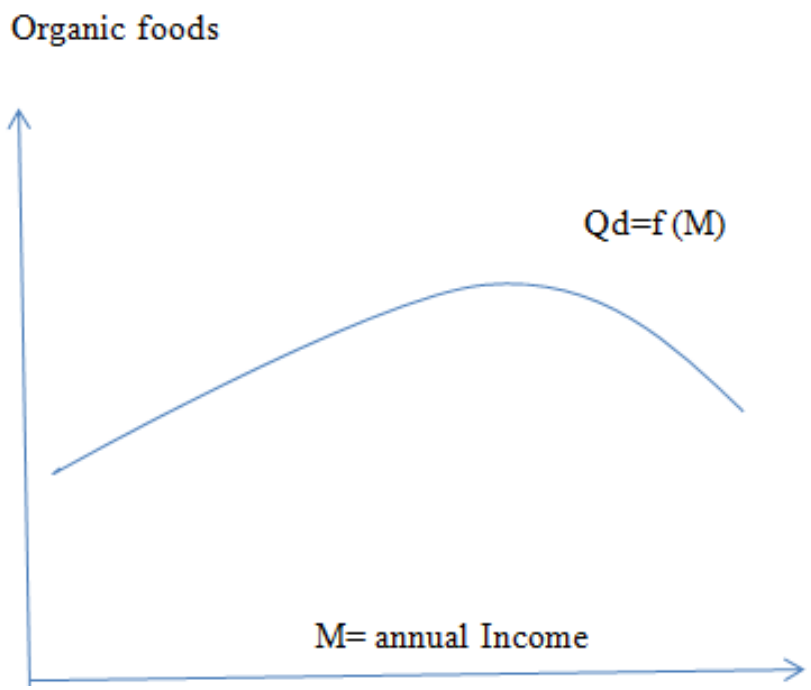


Figure 2.8: Relationship between income earned and the demand for organic food (a luxury) (*Source: Authors Research)*

Larger incomes allow for more expensive food items such as steak, restaurant foods, and organic food. Dobbs (2012) states that high quality foods are more expensive and, as such, increases in income resulted in an increase for goods demanded, as shown in the figure 8 above. The relationship between income and consumption is very crucial in forecasting the future of organic foods. This means that as the standards of living improve/ increase, buyers are more likely to increase the amount spent on quality foods such as organic products that are certified (Mendenhall, Reinmuth and Beaver, 2002).

2.14.3 Price of related goods (P_r)

Consumers base their purchasing on the price of the related commodities alongside the price of the goods they are willing to buy (Mendenhall, 2002). The price of the related goods is very important for organic foods since other conventional goods are always readily available and more often than not, they are cheaper (Packaged Facts, 2013). This means that organic foods and conventional foods act as substitutes which means that a consumer could easily shift from conventional to organic foods based on changes in their tastes and preferences.

2.15 Organic food market in Canada

The sale of organic foods in Canada is estimated to be growing at a rate of 25% per annum (Canadian Organic Growers, 2010). Growth is particularly strong in the sale of fruits and vegetables and seems weak in the dairy sector. Since 2000, organic sections have been established in supermarket chains and other outlets. Most organic foods are still being sold through direct markets in food stores erected in the organic farms. Some organic foods are also exported to other parts of the world with grains topping the list of Canada's organic exports (Canadian Organic Growers, 2010).

However, even with the increased demand for organically produced foods, there are various challenges that hinder realization of its full potential. This study further seeks to identify some of the problems from various readings with respect to local community organic farming (Chang and Zepeda, 2005).

2.16 Challenges facing organic farming

2.16.1 Technology

Farmers deal with the dilemma of how to use technology the world over. Many farmers and, especially, those in developing nations do not have the technical expertise on how to produce green manure and to apply it in farming practices. With the high demand for organic products and the high efficiency that is required, farmers have no option but turn to technology to improve production and satisfy their customers (Strauss, 2015).

Farmers need to understand how technology works to their advantage. For example, the use of a roller crimper during harvesting of hay helps in breaking down the cell walls of plant stems that quickens the rate of decomposition, which increases soil fertility without the need for conventional chemicals. According to William (2007), the cost of some of the farm implements and tools highly discourage farmers from acquiring them. Further, some technology requires some form of training before a farmer can use them. This requires time and money, which most farmers do not have.

2.16.2 Pests and weeds

Pests and weeds are persistent distractors to achieving good quality food products in any farming activities (Zinati, 2002). Conventional farming uses pesticides and herbicides to keep the pests at bay. However, what about the organic farming people who cannot use the chemicals? Generally, if the farmer is unable to understand the mating habits of pests, he can lose his whole crop. According to Cook, Khan, and Pickett, (2007), the use of sticky traps that are often coated with female pheromones to attract maggots and males' insects should be encouraged. In light of all

these factors, farmers need to be educated on how to protect their crops from persistent pests in order for them to prevent losses and to improve their produce.

2.16.3 Lack of market information

Organic farming is a very information intensive system of farming, and many farmers do not understand which plants to grow throughout the year (Scialabba and Hattam, 2002). They do not understand what growing season to grow particular plants and during their crop rotations, what crops should follow, or what to do to minimize soil nutrients' depletion. Their lack of market information often leads to poor products that do not fetch high market prices, and more specifically, can discourage the farmers from venturing into organic farming in the future (Bello, 2008). Additionally, Bello states that many farmers have little or no ideas on the various means distribution channels to use in order to reach a larger clientele, which limits their potential to grow and enjoy economies of scale.

Provision of information on how to use organic management practices is of great importance in organic farming. Good management practices in organic farming are more important than in conventional farming. Education and information are, thus, a necessary condition for the diffusion of organic farming. The lack of information creates a barrier to the success and adoption of organic farming (Seufert, Foley and Ramankutty 2012).

2.16.4 Certification

In Bello's (2008) findings, most developing nations' organic farmers experience a huge problem with certification, which not only adds a considerable cost to the production process, but also

poses a technical problem. To get certification, processing facilities, and organic farms should submit organic system plans that are required yearly by the certifying agents. Certification also increases delays in distribution, where a farmer has to wait a long time before he can start his product distribution. The increased cost in production is transferred to the consumer in one way or the other. Importers of these organic foods always require a certificate that indicates the organic origin of the products, thus, if there is no certification, and then the farmer cannot conduct business (Morgera, Bullon and Marin, 2012).

What is certification*?*

According to the USDA (2014), certification is the process by which organic farmers are given the authority and power to produce organic foods. This way, there is an assurance on the consumers end that the food products that they are consuming are actually produced organically. The USDA (2014), states that all organic producers of food crops, dairy, and even fiber must be certified. Further, even those who handle the organic foods should be licensed according to the law.

There are clear indications by the United States Department for Agriculture that the methods and materials used in the production of organic foods must meet the required standard and that clear documentation of the materials and methods should be kept and produced when required. In Ontario and Canada, the certification of organic farms is carried out by third party Certification Bodies (CB) approved by the Canadian Food Inspection Agency (CFIA), (Organic Council of Ontario, 2014).

2.16.5 Purpose of certification

According to Yadav (2012), certification addresses the growing demand for organic foods in the world. Its main purpose is to prevent fraud and enhance quality of the organic foods produced. It helps to identify the producers and the methods and materials used in production of the foods, which is of great concern to consumers.

Additionally, Yadav (2012) states that certification helps in the regulation and distribution of organic products. Different certification centers have different service marks that act as brands, which can be used by the consumers. Different countries, however, have different logos that are used in labeling of the organic goods (COTA, 2014). In Canada, the logos (figure 2.9) below are embedded on the packaging material of the organic products.

Figure 2.9 - Organic Labelling

2.16.6 The process of certification

In Ontario and throughout Canada, a number of certification bodies (CBs) are established, including Center Systems Integration (CSI), Ecocert and Procert. In order to acquire certification, an individual is required to contact one of the above-named certification bodies. According to the Organic Council of Ontario (2014), the individual is required to fill out an Organic Production Plan, a field history sheet and provide a field map. The paperwork will differ depending on the type of facility (i.e., farm, processing plant, etc.). Then, inspectors go to the site to inspect the facilities and fill out the necessary paperwork; accordingly, a report is subsequently written by the CB and sent to their respective head office. Finally, the report is reviewed, and further steps are issued on what is needed to be done in order to meet standard requirements or you will not be granted organic certification (Organic Council of Ontario, 2014).

2.16.7 Benefits of Certification

- Protects consumers from fraud
- Having the certification mark on the products acts as a marketing advantage for producers.
- Reduces confusion with other food products that are produced conventionally
- Certification helps farmers receive premiums for their produce.
- In case a farmer needs additional funding for organic farming, it becomes very easy for them to access funds once they are certified (USDA, 2014).
- Helps farmers to access local and international markets

All these certification activities are very tedious and discourage many farmers from initiating the process.

2.16.8 High costs of organic products

Organic products are currently very expensive (Midmore and Lampkin, 2004). The main reason can be said to be to the accumulation of costs such as transport, growing, harvesting, and the storage of the products. Since they do not have any synthetic chemicals that can help prevent pest and diseases attacks, storage of organic produce is always of high quality. Thus, the costs of the produce increases. Bello (2008) adds that, there are fewer organic products in the market as compared to conventional products. When the demand goes up and supply is low, the prices increase. Strauss (2015) states that the fact that there are no chemicals used in production means that more labor is required which is very expensive. Additionally, the high cost of compost for those farmers who cannot produce their own and have to ship it from elsewhere translates to an increase in the cost of the products (Groh and McFadden, 1998).

The cost of seeds to grow in organic farms is also quite costly. This is because the seeds selected need to adapt better to the environment without depending on synthetic fertilizers, which makes the selection of seeds a rigorous exercise (William, 2007).

2.16.9 High labor input

According to Yadav (2012), organic farming is labor intensive and requires high labor input to carry out the mechanical and manual work that are required for growing the crops. Selling and distribution of products also requires considerable labor, which is not always available. Where it

is available, it is often very expensive and these costs are eventually transferred to the consumers who, in most cases, have to bear the economic burden.

2.16.10 Dependence on the international market

Organic agriculture in developing nations is mainly export-oriented (Nandwani, 2016). Farmers here depend on access to international markets. International markets require rigorous certification procedures and are often subjected to international regulations that are dictated by foreign bodies disrespecting the opinions of the poor farmers. Dependence on international markets poses a great obstacle for farmers in developing nations. There are also substantial delays before the farmers can receive their payment, due to policies and regulations that are strictly followed.

Some farmers are forced to sell their products at a very small price to garner instant funds. Newton (2007) states that the international organic trade is often criticized for reproducing the inequalities of concentrating market power to transnational organic certifiers and buyers while imposing hefty costs on producers. It has also been blamed for giving preferential treatment to large producers, thereby increasing the inequalities between the large producers and the small farmers.

2.16.11 Inadequate time for production

Newton (2007) acknowledges that there are many farmers, who do not take enough time to learn about organic farming. He further states that most farmers and especially those who are new to the operations of the CSAs have little knowledge of the amount of time required to grow crops

and succession planting. Extensive planning before the start of the season would be paramount to reduce the struggles of hurried planting that would otherwise lead to low quality goods and losses (ICM, 2011).

2.16.12 Lack of producer commitment

According to Holden (2004), lack of producer commitment greatly affects the quality of the organic foods produced. Some farmers opt to turn to organic farming as a last option when they fail in traditional farming. These kinds of farmers are motivated solely by profit and not the passion of the trade and, as such, end up not producing high quality foods. The uncertainties of weather, pest damage, and diseases can also greatly affect a farmer's morale to produce crops (Olesen et al., 2011). To support organic farming in Canada, the government has set up various ways in which to boost organic farming as discussed below.

2.17 Government and institution support

The Canadian government has set up various ways to boost and support organic farming. One of the ways is through funding of research in organic farming. More funds are allocated for research to improve organic farming methods. Provision of extension services whereby farmers gain training on how to use technology associated with organic farming is helpful as well. Financial support is also extended to farmers who want to venture or convert their efforts into organic farming.

Another way that the government of Canada has shown support of organic farming is through the introduction of organic farming as a course in many agricultural colleges. This has not only

boosted the growth and development of organic farming in Canada, but also provided a space where students and potential farmers can learn more on organic farming and the various projects associated with it. Policies and regulations that favor the conversion into organic farming and boosts organic farming have been implemented (Hill and Macrae, 2012).

2.18 Sustainable healthy organic food systems

As stated by Bruch and Ernst (2010), the importance of good farming practices is not a new concept. Good farming practices helps in maintaining good soil conditions that, in return, help to produce quality food. We can improve agriculture in ways other than using genetically modified organisms or increasing the use of chemical inputs. The use of other, more sustainable, methods such as organic farming leads to greater health for the soil and the communities. Organic farming, as we know it, started because of the need to have food that is produced in a more environment friendly way without the use of synthetic chemicals.

We all know that food production and consumption are the main causes of pressure on the environment. Every step-in food production from growing of the crops to the distribution of the ready food has great impact on the environment. This project hopes to identify niches in the data in order to come up with more sustainable methods of food production (Strassner and Cavosk, 2015). The impact on the environment mainly stems from the over exploitation of natural resources such as water and soil, emission of toxic gases into the atmosphere and poor management of natural resources.

As reported by the USDA (2014), Canada has seen steady growth in the organic farming sector, and it was at its highest in the year 2014 as evidenced in the figure 2.10 below (USDA, 2014).

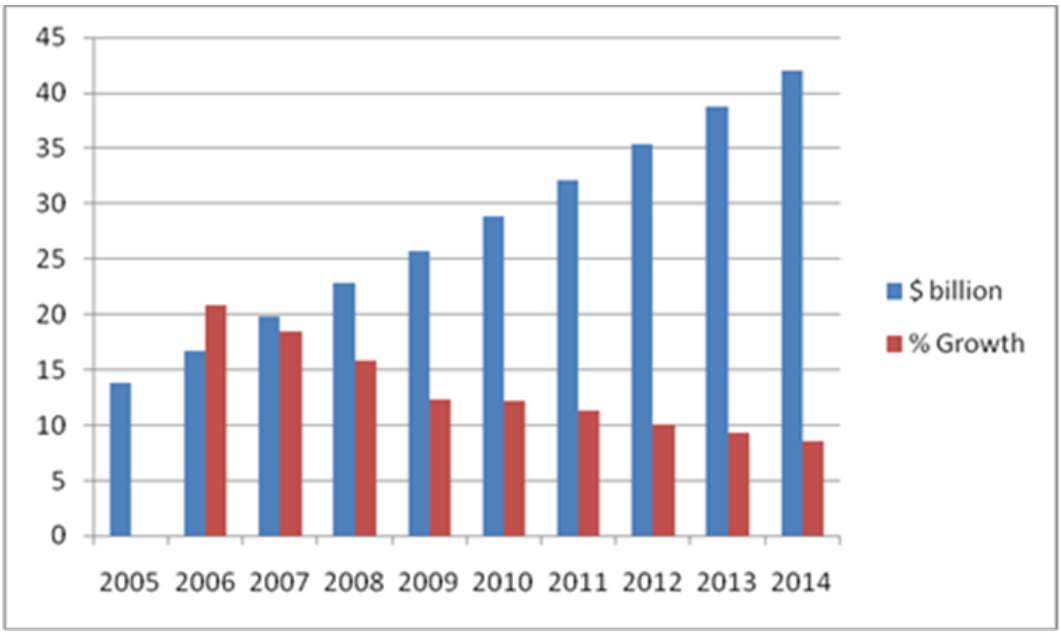


Figure 2.10 - Organic farming sector growth.

(Source: USDA, Economic Research Service, Organic Market Overview.

The above graph displays the stable progress of organic farming in Canada based on income and growth. As years progress, we notice that in 2006 the growth rate was actually higher than the income compared to the years after 2009. As low as the growth rate may seem, the income rate is quite impressive and this goes on to show that the organic farming sector is quite stable, thus, raking in more profits as year's progress. According to IFOAM (2013), Ontario's organic farms make up more than 1.2 % of all the organic farms in the province.

According to Agriculture and Agri-Food Canada - AAFC (2012), there has been tremendous growth with organic food demands, which emerged faster than the supplies, which led to the increasing number of certified organic farms from 1,172 in 1992 to 3,917 in 2009, as shown in figure below.

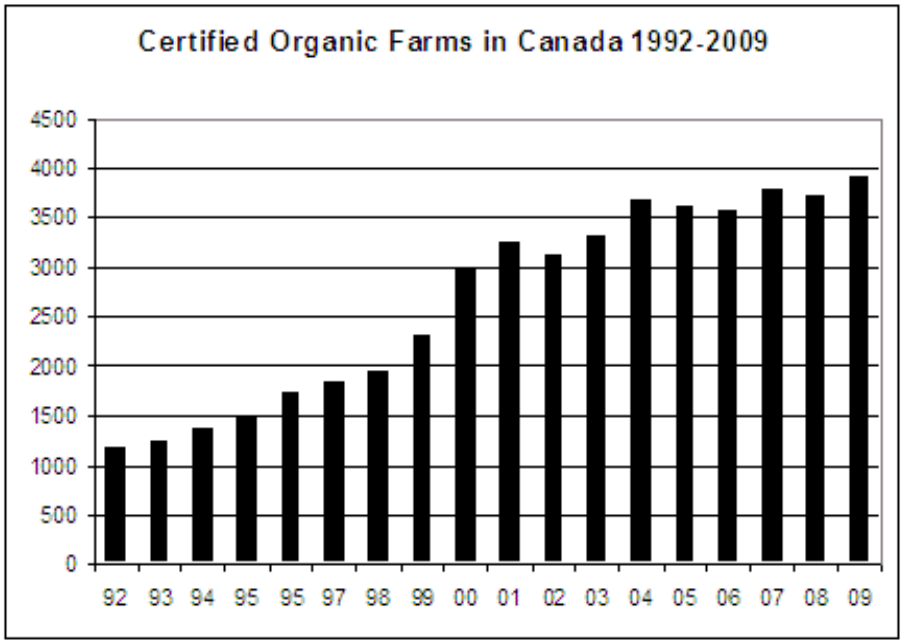


Figure 2.11 - Certified organic farms in Canada 1992-2009.
(Source: AAFC, 2012)

Canada's organic food sector is the fastest-growing agricultural sector in Canada, growing by a rate of 20 percent a year (Helga and Minou, 2007). Canadian exports most of the organic goods it produces, 80 percent to Europe, the U.S., and Asia. Hay and field crops, such as wheat, durum, and barley, are Canada's predominant certified organic commodity; with 2,462 farms, spanning about 230,500 hectares in 2008.Wheat is Canada's most valuable single organic export, valued at $18 million per year. Despite this growth in organic farming, Canada still imports 90 percent of organic grocery items and 80 percent of organic produce sold in the country (The Conference Board of Canada, 2008).

The shift from small-scale production to large-scale production has led to a change in consumer tastes and preferences. New models of purchasing foods have taken over (Padel and Lampkin, 2015). Technology has also influenced the change in purchasing patterns. Food that previously

was only available in seasons is now available throughout the year. Globalization has greatly improved idea sharing in matters of food (Brian, 2015).

Brian (2015) further argues that in as much as it has opened the world, it has also led to an increase in greenhouse gas emission, which, in turn, is intensifying global warming. As consumers, people need to be advised on the best practices to adopt in order to make sustainable food choices. New strategies of food production should be embraced at all levels, from seed selection to transportation and storage. This will minimize wastage, while at the same time ensuring that nutrient levels are maintained.

Sustainability maintains and creates conditions where human beings can use resources conservatively, without compromising the ability of either future generations to provide for their own needs socially, economically, or other general needs that they might have (Brian, 2015). Key stakeholders in the food sectors should embrace the use of sustainable food systems. Organic food production offers a delineated food system that can be explored due to its potential in providing sustainable food diets.

Industrial agriculture is unsustainable because it utilizes synthetic fertilizers, pesticides, and herbicides. During harvesting, petroleum products are required to run their machines. An agricultural practice that relies on petroleum, which is limited, is unsustainable. Further, genetically modified organisms that are used in conventional farming increases yields (Peterson, 2001). However, an increase in farm yields means an increase in energy trade-offs against the ability to fight pests and diseases. Jordan (2002) states that, genetic engineering does not increase the photosynthetic energy available to plants, but rather it re-directs it. Losses of genetic diversity have been noted due to the prevalence of monocultures that are mainly used in industrial/conventional farming.

Organic seeds, on the other hand, are the best for the environment. The foods that we consume go directly into our bodies and, thus, the methods by which the food was produced feels more pertinent than the method used in seed production. Nevertheless, whether the seeds are organically grown or not does have a significant impact on the environment.

In conventional planting systems, plants are grown using a great deal of fertilizers and chemicals that protect them from pests and diseases without much consideration as to the effect that it has on the environment. Organic farming, on the other hand, utilizes complex nutrients that come from green matter such as compost. Since there is little or no application of pest and disease control chemicals, plants become adapted in defending themselves and, thus, are more sustainable (Navazio, 2012). In organic farming, crops take longer to mature because they undergo the entire cycle of maturation. This way, they become healthier and acquire better flavors as compared to those that are quickly matured using synthetic chemicals.

2.19 Organic agriculture and the global food supply

Holden (2004) argues that in as much as we are advocating for the use of sustainable food systems, many people would question whether organic farming could feed the world. According to Jordan (2002), research conducted over a period of 21years (1993-2014) as to the question between conventional farming and organic farming proved that while crop yield in organic produce was lower by 20 percent, the use of pesticides had reduced by 97 percent when compared against the conventionally produced foods. This indicates that while the gross income from organic fields is lower, the net income is higher.

The study concluded that organic crops yield per hectare could equal those produced through conventional agriculture, although factors such as weather and seeds determine the crop yield in both methods. Badgely et al. (2006) claim that model estimates indicate that organic methods of farming can produce enough food on a global *per capita* basis that can sustain human populations in the world without necessarily increasing the agricultural land base. They also argue that the amount of nitrogen fixed into the soil by leguminous plants is enough to replace the amount of synthetic fertilizers that are currently being used. This study by Badgely et al. (2006) shows that organic farming has great potential to contribute to sustainable global food supply, while at the same time reducing the detrimental effects on the environment of conventional farming

As Lu, Toepel, and Irish (2006) state, organic foods have a higher level of nutrients that promote better health such as antioxidants, vitamins, and minerals and contain lower levels of harmful pesticides as compared to the conventionally grown foods. Lu et al add that drinking organic wine has a greater chance of preventing against the oxidation of Low-Density Lipoprotein - LDL than conventional wine. According to a study by Lairon (2009), on the vitamin and mineral levels of the organic and the conventional foods revealed that the iron content in organic foods was higher than the conventional. With respect to vitamins, ascorbic acid was higher in organic vegetables and fruits than in the conventional foods (Alan et. al., 2009). The figure 2.12 below gives a summary of the differences in the nutritional values of organic foods and conventional foods.

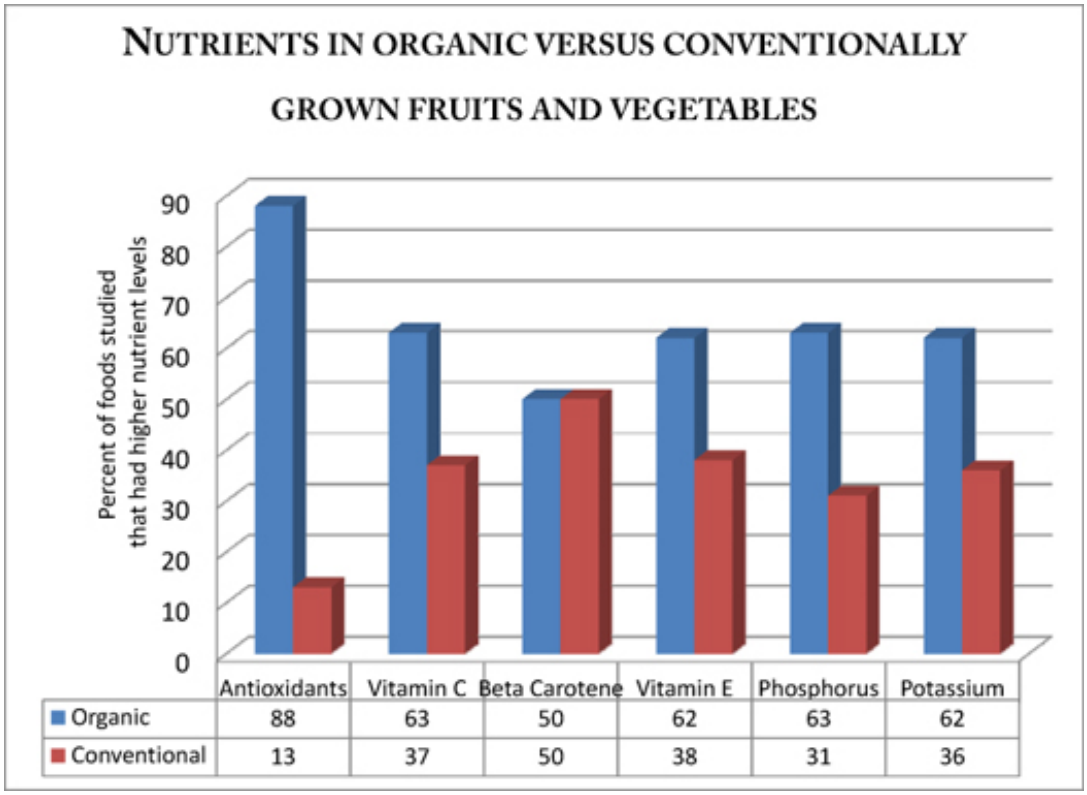


Figure 2.12: Nutrients in organic versus conventionally grown fruits and vegetables (Source: A Systematic Review, *The American Journal of Clinical Nutrition*)

The above diagram illustrates that organic foods are superior in nutrition as compared to conventional foods.

According to The International Federation of Agriculture Movements, (IFOAM, 2012), fears that organic farming methods cannot produce enough food to feed the world as the conventional methods do are incorrect (Juan, 2012). They claim that organic farming requires more agricultural land than conventional agriculture does. Additionally, critics argue that there are insufficient amounts of organic fertilizers to produce enough organic food to feed the world (Uzogara, 2010; McHughen, 2000; Sovacool and Brown, 2010). However, organic farming

clearly has many positive implications on the development of a community's socio-economic sector. However, some researchers feel that it also has some disadvantages that can affect a community.

2.20 Social-Economic development

According to The Millennium Ecosystem Assessment (2004), social-economic development refers to a process that seeks to identify both the social and economic spheres in a community. It seeks to create strategies that will help in addressing those members in a community that are in need of ways that are reasonable and in the best interest of all stakeholders. The main idea is to determine ways to improve the living standards of the members of that community; also ensuring that they are healthy and that they can meet their present needs without strain. Social-economic development mainly occurs in metropolitan areas, rural settings, and sections of smaller cities (Aguilar, Ward and Smith, 2003).

Various factors should be considered in an effort to bring about social-economic development. First, one needs to have an understanding of the existing situations in the region. Considering the perspective of human resources in the area would aid in initiating a development blueprint that will ultimately bring more employment opportunities for the people in that area. Secondly, social-economic development also considers the availability of essential services such as presence of schools (Scialabba and Hattman, 2002). Bringing services such as better agriculture and other social amenities like health facilities to an area markedly improve it. Producing and keeping a practical law implementation agency help to maintain law and order and thus, people will not be tempted to leave the region to look for those services elsewhere (IFOAM, 2012).

While there is no one right way to go about social development, the process is very important and prevents the decline and extinction of the community. The International Labor Organization – ILO approach states that although economic development is important, it is not an adequate state to realize poverty decline. A decline in poverty consists of development with a considerable reorientation of strategies to favor the indigent in the said community. It also involves changes in laws, regulations, institutions, and practices that are all part of the processes that perpetuates poverty.

Economic growth without creation of quality jobs is not sustainable (Brian, 2015). This can be explained in three interrelated ways. First, the majority of the advanced economies have a growing proportion of the workforce that is dropping out of the labor market thus, increasing human costs and leading to an increase in the erosion of economic recovery (Bureau of Labor Statistics, 2015 U.S Department of Labor, 2015). There is an increase in long-term unemployment and more than 40% of unemployed persons have been without work for more than a year. On a global level, youths are more affected by unemployment than their elders are. Secondly, to sustain the recovery of an economy, several emerging and developing nations should integrate the gains made in promoting domestic sources of growth in order to pay for the weaker export markets in the more advanced economies (Strassner and Cavoski, 2015). Having more developed social policies and employment can be instrumental in helping this take root. At all levels, respect for core labor standards is important.

Thirdly, the sustainability of the growth process of an economy is threatened by the frequent imbalances of income, which has several dimensions (Wang and Zhou, 2014). One is that labor incomes lag behind productivity development. In some developing countries, the gap between

labor incomes and growth in productivity has contributed to the rising export dependency of these nations. Another dimension is the attractiveness of the financial investments as compared to the real investments in advanced economies (Pilat, 2013). There is evidence that unemployment and huge income differences between the employed and the unemployed is the main reason why there is an increase of unrest in many parts of the world.

Kendal (2014) argues that the organic farming methods are not sustainable to produce enough food to feed the world as the conventional methods. They claim that organic farming requires more agricultural land than conventional agriculture. Additionally, critics argue that there are insufficient amounts of organic fertilizers to produce enough organic food to feed the world. Perfecto and Badgley (2007), state that, despite criticism on organic farming, it can actually produce a substantial amount of food to feed the world's population on the current land base while still maintaining healthy and fertile soils.

Arguably, comparable exertions fixed towards organic practices can lead to further increases in yields as well as in soil fertility and management of pests. Production per unit area would be greater on small farms as compared to large farms both in the developing and developed nations. This means that an increase in the number of small farms will improve food production (Seufert et. al., 2012). Organic farms require a greater work force; thus, they employ more people especially in developing nations. This reduces rural unemployment in many areas.

The Millennium Ecosystem Assessment Report of (2004) points out that, the promotion of agricultural practices without harmful trade-offs that result from excessive use of resources such as water and nutrients should be encouraged. Organic farming when properly intensified can provide enough food to feed people and more importantly, increase food security in developing nations that struggle with acute food shortages (Badgley and Perfecto, 2007). When talking

about global food supply, it would be difficult to overlook the impact that genetically modified foods have had in the world. Many times, Genetically Modified Organisms (GMO) provokes heated debates as to why they should or should not be used. However, what exactly are these GMO?

Genetically modified organisms generally refer to plants or crops that are created for human consumption using molecular and biological techniques (Makoni and Katerere, 2010). The plants are usually modified in the laboratory under certain conditions and are enhanced to attain the desired traits, for example, increasing resistance to pests and diseases while at the same enhancing the nutrient content of the foods. The enhancement is done through various methods such as breeding, cloning, and hybridization. Normal methods of breeding are time consuming, yet GMO provides a platform where plants are produced with the exact traits that one would desire, to illustrate, genes from a drought resistant plant can be infused into another plant that is prone to drought, thus making it more drought resistant (Sweet and Eastham, 2002). Further, non-plant organisms can be used to enhance a plant trait, for example, the use of B.t *Bacillus thuringiensis.* B.t is a naturally occurring bacterium that produces proteins from lethal to larvae, thus protecting the plant from pests and diseases that are associated with larvae.

There are various advantages associated with GMO. First, there is increased pest resistance in the plant. A reduced pest attack ensures increased yields by preventing premature deaths in plants that result in losses. Lately, many people are cautious about the foods they partake in, thus opt to buy foods that utilize little or no pesticides. Growing foods that are genetically modified to resist pests reduces the need for pesticides, which also reduces the costs of production and the cost of the produce in the end. Secondly, the food crops have improved in nutritional value (Sweet and Eastham, 2002).

Malnutrition is a common occurrence in developing nations where people depend on a single crop such as rice or corn for all their nutritional needs. Rice can be genetically modified to improve its nutritional value, thus alleviating nutrient deficiencies, especially in children. Thirdly, improvements in pharmaceuticals, medicinal vaccines are invariably very expensive and many people in the third world nations are not able to afford them. Scientists are in the process of producing edible vaccines that are incorporated in the genes of plants that people can eat every day, thus making them more available (Makoni and Katerere, 2010). GMO crops have the advantage of being more drought resistant. Food security in developing nations is highly compromised by erratic weather conditions, such as extended droughts and floods. GMO crops are modified in such a manner that they can withstand the weather conditions and yield produce without compromise (Strauss, 2015).

2.21 Criticisms of GMO

According to Uzogara (2010), environmental activists, public interest groups, professional associations, and even government officials have raised concerns about the continued production of GMO foods. They have criticized agribusiness departments, especially in developing nations in Sub-Saharan Africa for being profit oriented and having little regard to the potential environmental and health hazards that these genetically modified foods cause. In terms of the environment, the anti-GMO campaigners claim that they cause unintended harm to other organisms. For instance, breeding a non-plant organism with a plant obviously brings about some permanent changes to the plant. Further, in the example of the B.t species that is intended to kill larvae that destroy plants, more than the intended species of insect larvae are

indiscriminately killed since it does not differentiate between the necessary larvae and the harmful larvae.

The activists' groups against GMO also raise concerns over the reduced effectiveness of pesticides on the genetically modified (GM) crops. Many dangerous insects become resistant to pesticides after a long time. There is a concern that GMO organisms could become resistant to pesticides, thus creating an even bigger problem in the environment (Makoni and Katerere, 2010). Crop plants engineered for herbicide tolerance and weeds can cross breed, resulting into a situation where we have 'super weeds' that are herbicide resistant (Blench 2015)

McHughen (2000) indicated, there are human health risks that are associated with GM foods that activist groups are protesting, such as the aggravation of allergies. Many children in Europe and in the U.S.A have developed many life-threatening allergies towards ordinary foods like fish and peanuts (Anaphylaxis, 2015). The possibilities of introducing new genes into these foods may result in the formation of compounds, which have more allergen components. Additionally, there are assumptions that consumption of GM foods may result in unknown effects on human wealth. Introduction of new genes in foods may bring about new compounds that may have very negative and unexpected impact on human health and in animals that consume the by-products of the genetically modified plants (Holden, 2004).

The problem of cross-pollination and gene transfer to other non-target issues can be resolved in several ways (Holz, 2009). One, scientists should produce GMO food crops that are male sterile (cannot produce pollen). Cross-pollination in this case would not occur, thus the GMO plants would not be of any harm to the other plants. Another solution is to create buffer zones around the area where GMO foods are planted, as in the case of non-GMO corn, which can be planted to surround a field with GMO foods, and the non-GMO food would not need to be harvested. In

this case, beneficial and harmless insects would have a 'home' in the non-GMO food crops and would eventually become resistant to the corn borer and other harmful larvae.

Individuals and scientists have compared genetically modified foods with organic foods many times in general. The results do not contradict the previous studies on the impact that the two have had on human health. Studies show that both organic and GM foods have a high nutritional value as compared to conventional foods (Blench, 2015). They are seen as having the potential to produce enough food to feed the world. However, according to Jordan (2002) organic foods seem to have better nutritional and disease fighting values as compared to the GM foods. She argues that GM foods are more likely to cause unknown effects on human health.

Regarding their impacts on the environment, Brandt, Leifert, Sanderson, and Seal (2011) argue that organic foods have minimal negative impacts on the environment as compared to the genetically modified foods. He argues that GM foods when crossed, through pollination, with non-GM foods can lead to formation of new organisms that can pose a danger to the environment, such as the super-weeds. Brandt, Leifert, Sanderson, and Seal (2011) also argue that most literature confirms that most people do not know the benefits of genetic modification to the environment and, thus, it would be unfair to generalize the impact that GM has on the environment without adequate knowledge.

According to Jordan (2002), many respondents had very little fear that organic foods may be harmful to their health. There was some inherent fear that GM foods caused illnesses such as cancers. People question if it is acceptable to use genetically modified organisms-like seed in their organic farms (Bruch and Ernst, 2010). In the recent past, this has caused heated debates with some scientists and researchers arguing that organic foods should not be mixed with the genetically modified foods. According to the Research Institute of Agriculture - FIBL (2015),

studies have shown that farmers from around the world have lost their organic farming certification due to contaminations from other GMO farms.

This means that if a farmer decides to grow organic foods, then they should be organic entirely and to never mix the two. Organic foods are supposed to be free from all manner of contaminations of pesticides and gene manipulations. Some farmers argue that planting seeds that have been enhanced through gene manipulation to make them more resistant to pests and diseases, in the guise of making them look like organic crops, is more or less the same as planting genetically modified organisms. Organic farming has many positive implications on the development of a community's socio-economic sector. However, some researchers feel that it also has some disadvantages that can affect a community.

2.22 Organic farming and socio-economic development

Refer to Navazio (2012), organic agriculture provides other benefits to the community besides profitability of the organic cash crops. It can help generate social capital that can empower small producers as they organize themselves to become cooperatives. Organic cooperatives are known to foster social networks by provision of training and extension services, as well as access to health and credit programs. In many areas, organic farming also provides an opportunity for people to use the available local resources as well as integrate traditional farming knowledge as one of the many elements of organic management that are reminiscent of traditional farming methods in developing nations.

Pioneers of the organic movement did inspire peasant farming methods from Asia and Africa and sought to introduce them into the western world (Seufert, Ramankutty, and Foley, 2012).

Organic agriculture can also facilitate the participation of women and youths who have limited access to the formal credit loans that are offered for farming in many financial institutions. Additionally, organic farming includes livestock and cash crop growing as part of its diverse farming system.

A diverse system such as this helps to reduce the vulnerability of a community by lowering the economic dependence on one cash crop (National Farmers Union Canada, 2003). In a situation where a community relies on a single cash crop, it runs the risk of losses because climatic conditions or pests and diseases that could reduce profitability can affect that single crop. Farming systems that follow the agroeconomic principles are a source of more stable yields that are more resilient in harsh weather conditions as compared to conventional agricultural systems.

Since organic farming does not use pesticides, it reduces the exposure and adverse effects that farmers would experience if they were using the chemicals. More than 20 million people living in developing nations and working in industrial agricultural farms experience episodes of pesticide poisoning at least once every year (Jeyaratnam, 2007). In developing nations, three out of four people live in rural areas and more than 80 percent of the people dwelling in rural areas are involved in some sort of farming activities even for subsistence consumption (Nandwani, 2016). Improving the farmer's standards of living is a major concern in developing the rural areas (World Bank, 2015). Studies show that organic farming contributes much to the farmer's food security and markedly improve his/her livelihood (Scialabba and Hattam 2002). However, most of these studies do not differentiate between organic farming and other sustainable forms of agriculture.

Research by Baranski (2014) shows that, organic farming has a great potential to improve rural development largely through the provision of environmental services. The Canadian

International Development Agency – CIDA (2006) has devoted itself to including environmental concerns into its decision-making activities. Activities such as organic agriculture that are concerned about environmental conservation and economic growth are thereby important to consider in Canada and CIDAS effort to develop organic farming.

2.23 The economic impacts of organic agriculture

In Canada, organic farms are on the rise, and they have captured the rapidly growing share of the food market and its benefit from increased policy support from many stakeholders (Canadian Organic Growers, 2010). Some of the economic impacts of organic farming are as shown below.

2.23.1 Employment

According to a report by the International Fund for Agricultural Development-IFAD (2005), organic farming goes beyond the employment aspect that another studies dwell on. They argue that the impact that organic farming has on employment is mainly positive, thus refuting the argument by Parrott et. al. (2006) that organic farming brings more employment problems than it offers positive contributions. To some extent, Hole (2005), agrees that with advancement in technology in the organic farming sectors and that employment of under skilled personnel will be affected greatly.

Generalizing results on employment is a rather difficult task due to the different approaches that are used. Labor use can be studied in two ways. One, is through analysis of existing data and the second one through conducting specific surveys of organic farms. The manner in which the

comparison is conducted might greatly affect the results. Labor use is, in most times, expressed either through the pairing of organic or non-organic farms or through clustering.

It becomes very challenging to find an area with variables that can explain the rise of organic farming in areas where there is a diverse political, agricultural, and economic history. In most cases, organic farming has been presented as the tool that makes people stay in the countryside. Research by Bakewell-Stone et. al., (2008) shows that organic farming demands more labor input as compared to conventional farming methods. Increase organic farming means an increase in the demand for more labor.

2.23.2 Generating and retaining values in the area

The economic impact of organic farms in a community goes beyond the employment aspect. Leifeld and Fuhrer (2010) determined the possible multiplier effects of organic agriculture compared to conventional farming. The three multipliers were output, income, and employment. The output multiplier states that there were only marginal negative and positive differences between most farm outputs. The income multiplier states that the forage and pasture crops produce more income in organic farms when compared to conventional agriculture. Hole (2005) further suggests that the conversion to organic farming has a potential to generate a substantially wide societal and economic impact.

2.23.3 Diversification of organic farming

Agri-environmental schemes along with participation in farms based on diversification, plays a major role in rural development. According to Foley et. al. (2012), the proportion of farms

engaged in diversity, no matter how little the investment, seems to be higher in organic farms at 77%, while those in conventional farming stand at 67%. This shows that the result of diversification in organic farming has a significant impact on development.

2.23.4 Skills, networks, and knowledge

According to Kinsella et. al. (2000), strengthening of ties within different communities is seen as a very important aspect of the formation of strong rural economies. Higher levels of social capital foster innovation although they are dependent on norms that promote creative thinking among members. Organic farming promotes skills and knowledge in that farmers are able to share their ideas with one another and help each other to grow their respective crops. Organic farming is more information based than it is technical based (Padel and Lampkin, 2015). Thus, farmers are always actively searching for new information. Due to the constant search for knowledge, crucial networks are formed. Recently, there has been great emphasis for farmers to take advantage of the information and knowledge available to them in order to adapt to the changing market needs. Availability of information for organic farmers enhances their ability to cope with the changing times and helps them to know the current trends in the practice (CIDA, 2006).

2.23.5 Consumer protection

Consumers often prefer to eat organic products more than conventional foods, in that they are aware that organic farming prohibits the use of synthetic chemicals and that the fertilizers used are environment friendly (USDA, 2014). There are strong regulations in Canada whereby people

who mix organic farming with other farming methods are denied licenses. These way consumers have a guarantee that the goods labeled as organic are genuinely organic (Bakewell- Stone, 2008). Certification has been embraced as one of the most potent ways of protecting consumers from fraudulent people who would want to take advantage by selling products that are not organic.

2.23.6 Environmental goods and services

Organic farming creates an environment that is safe from pollution since it advocates for the use of green matter (Hole, 2005). The green matter, on the other hand, nourishes the environment through various ways and means. The farmers and society enjoy better and healthier foods and, at the same time, reduce toxic wastes that would otherwise pollute the environment. Bachmann (2011) suggest that the environmental goods and services provided through organic farming are an integral part of socio-economic development.

2.24 Market trends and target groups for organic product

A 2014 report by Bio-Pro studies show that women make up the largest percentage of the organic product consumers in the world. Organic foods are also very common with middle aged and the elder generation. There are lower figures for those under thirty. The study showed that besides the ethical and environmental concerns, the middle and older generations assess consideration factors such as animal welfare and food product safety before they purchase their food items, thus most of them opted to buy organic products, since they consider them to be safe and environmentally friendly (MacRae and Hill, 1990).

There are more and more consumers demanding information about a product before they can buy it. In most cases, they look out for the products provenance, origin, manufacturing, and, at times, the shipping and storage information (Carolyn and Lydia, 2009). This means that the seller should have detailed information about a product. Most producers are now labeling their packaged products so that the consumers can get the information that they need on the packaging material without necessarily asking the seller.

In a survey conducted by the Packaged Facts in 2011, analyzed and presented in 2012, 25% of Canadian people were willing to buy organic products primarily in that they are concerned about the environment. According to Seufert (2012), more than eight of the respondents bought organic products exclusively in that they considered them as being safe and healthy. At the same time, more than 25% of the respondents living in Canada were only willing to buy organic goods if their prices did not exceed those of the conventional products.

However, Clough, (2011) argues that people who frequently bought organic products were willing to pay as much as 26% more for them. Most of the respondents opted for organic grown fruits and vegetables. Demand for organic cereals and milk was lower than the demand for fruits and vegetables. According to the Canadian Organic Growers (2010), the market for organic foods has grown to more than 2%, with most outlets being supermarkets operating organic food sections. The Canadian certification department recorded an increase in the number of people who register for certificates as organic farmers.

Canada exports more organic grain products than other nations. In the last decade, distributors of organic farm products have initiated home deliveries to deliver their products to the customers who would otherwise not be able to go to the stalls to buy the goods. There is pressure from environmental organizations to industries to reduce emissions that cause pollution to the

environment and the resultant carbon emissions (Stolze, Piorr, Härring, and Dabbert, 2000). If home deliveries for organic products that are produced without any chemicals are distributed with vehicles that cause pollution through emission of greenhouse gases, then it begs the question if organic farming and marketing is sustainable.

This study project has been instrumental in answering the question; are organic farms in Ontario challenged by profitability? Moreover, the current study also supports the benefit and cost of agriculture from social and environmental health perspective, which are known "externalities", therefore, the social health and environmental benefits and costs must be evaluated in order to understand the impacts of all inputs and outputs.

It has discussed in detail the positive and negative aspects of organic farming and the conclusion is that organic farming is a profitable venture for those that are patient. It also elaborates on the various benefits that organic farming and, particularly, the CSA farms are bringing to the community in general. The problem areas addressed in this study include environmental sustainability and makes comparisons to genetically modified foods that elicit both criticism and praise. Further, it explains the socio-economic impact that organic farming has on communities.

2.25 Conclusion

Many farmers worldwide are converting their farmlands into organic farms. There are many reasons why they are motivated to take a step towards this direction. According to researchers, there are various reasons why many are converting to organic means of production, and they have classified them by environmental, health/safety, economic/financial and ideological motives. Canada's organic food sector is the fastest-growing agricultural sector in the nation,

growing by 20 percent a year. Canadian exports most of the organic goods it produces with 80 percent sent to Europe, the U.S., and Asia.

Despite this growth in organic farming, Canada still imports 90 percent of organic grocery items and 80 percent of organic produce sold in the country (Tilsworth, and Thoren, 2009). Key basic benefits of organic farming based on this study is consumption of healthy food, not limited to other benefits, such as better environmental condition since the natural habitat is not affected and minimal ingestion of chemicals used such as pesticides that may bring about health problems. Many farmers who feel encouraged to conserve the environment, while at the same time enjoying fresh produce from the farms, have embraced organic farms including Community Supported Agriculture. Some farmers are encouraged by the current market prices; thus, they convert to organic farming. While the reason for converting may differ from one to another farmer, there is a general agreement that organic farming has many benefits to the environment and to human health.

Being that organic farming prohibits the use of synthetic fertilizers and chemicals, it reduces pollution that is associated with the pesticides, and which is known to cause Green House Gases. Human health is also taken into consideration in that organic farming reduces the pesticide residual value thus reducing human diseases. Practices such as crop rotation, use of green manure and mulching increases in soil stability while retaining nutrients as well as improving soil structure are demonstrating benefits. There are many challenges that are associated with organic farming that discourage it. Certification is one of the main challenges that hinder those who want to engage in organic farming. Certification is a compulsory document for all people doing organic farming, thus it is very important. Lack of market information and poor technology are also barriers to organic farming.

In Canada, organic farming will continue to grow as long as the attitude towards organic farming remains positive. Their general concern for the environment and an increased understanding of the Ecological and Food Safety Act as the driving forces toward the growth of organic farming. The increased awareness on the connections between environment and food safety has been applauded as having strengthened the organic farming sector rapidly.

Despite the increased growth in organic farming, there are various challenges that the organic market in Canada is facing. Some of these factors are over utilization of resources that are required to help in organic farming, which especially happens when activities such as overstocking, and overgrazing occurs on the organic farms. When some of these factors that put pressure on resources persist, the goal to have nutrient rich soils structures become unachievable.

The main question asked in this study is; are organic farms in Ontario, challenged by profitability? The profitability of organic agricultural produce is mainly dependent on the amount of yields during a said season or after every harvest. The cost of organic production and the organic price premium also determine the profitability of the produce. Not all the said factors are stable, as they can change from one season to another and in different years. In one-year, organic farmers can receive higher and more stable prices for their produce (National Farmers Union Canada, 2003). On the other hand, organic products come with high entry costs that include very high labor requirements, since most of the organic farming work is done manually. Again, there is an increased need for more knowledge to the farmers, in regard to best organic farming practices, substantial certification and the need to buy equipment. The net effect of organic farming on production costs is determined by the reduction costs of inputs outweighing the increased costs of certification and labor. Parrott et.al. (2006) argue that the total production costs of organic agriculture are lower than in conventional agriculture.

2.26 Summary

The second chapter reviews and elaborates the history of organic farming in the world and Canada, particularly in the Province of Ontario. It also provides the importance of relevant issues regarding the venture. The chapter discusses and analysis several issues such as the health, environmental, food productivity, organic worldwide and Canada's mark and economics. Furthermore, this chapter describes and evaluates the challenges that organic farming encounters. These challenges embrace the technology, pests and weed, lack of market information, organic certification, high labour input, government role and institution support, and other related issues. In the end, it concludes by identifying research gaps and providing an overview of how the thesis fills the gaps.

CHAPTER THREE: METHODOLOGY

3.1 Overview

The thesis sought to determine whether profitability affects organic farms in Ontario by comparing and contrasting the productivity of small and medium-sized farms between 2015 and 2017. It hypothesized that medium-sized organic farms could take advantage of economies of scale, thereby exploit their high external input and high output production abilities to expand their profitability as compared to smaller farms.

3.2 Research Design

The researcher used a causal-comparative study design to evaluate the extent to which farm type influenced the profitability of organic farms in Ontario. According to Salkind (2010), the system entailed assessing the level of profitability of small and medium-sized organic farms in Ontario between 2015 and 2017 and determining whether it was influenced by farm type. Accordingly, farm type with two levels, small and medium, was the independent variable, whereas farm profitability was the dependent variable. The researcher chose the causal-comparative study design because the study period had passed. In this respect, the study was retrospective and sought to evaluate how the farm type influenced a farm's profitability (Salkind, 2010). In addition, the design was preferred because the researcher could not manipulate the study's independent variable to determine how it influenced the farms' profitability.

3.3 Research Philosophy

The study utilized a pragmatic research philosophy, which allowed for the use of qualitative method with participants observation. The approach involved combining qualitative and quantitative data to determine the extent to which farm type influenced the profitability of organic farms in Ontario. The qualitative data allowed farm managers who participated in the study to express their views without restricting them to specific answers. In contrast, the quantitative data restricted the responses provided to particular answers critical to the study's focus (Creswell and Creswell, 2018). By so doing, the researcher managed to determine other factors that influenced a farm's profitability other than the farm type. This aspect was essential to the study because it allowed the researcher to establish other factors and possible measures for enhancing farm profitability. The decision to use the pragmatic research philosophy was based mainly on the research questions because the first three could be answered adequately via quantitative data, whereas the fourth could be addressed well using qualitative data as it did not restrict research participants to specific responses.

3.4 Research Hypotheses

The thesis hypothesized as follows:

HA_1: There is a statistically substantial difference between the mean profitability of small and medium-sized organic farms in Ontario.

HA_2: There is a statistically significant association between farm type and its level of profitability.

HA_3: Larger organic farms could take advantage of economies of scale; thereby exploit their high input and high output production capacity to expand their profits better than small-scale farms.

3.5 Research Instrument

The researcher used a questionnaire consisting of four sections, mainly company or farm-related information, general questions, financial information, and environment and public health-related information, to collect data from the participants. Section one consisted of nine questions concerning the name of the farm owner, gender, age, the legal status of the farm, business type, farm location, farm products, and the number of employees. The second part comprised six questions related to land acreage, size of the land set aside for organic farming between 2015 and 2017, reasons for engaging in organic agriculture, and support those farmers obtain from relevant stakeholders, including the government. Section three consisted of nine questions to determine the farms' total gross revenues between 2015 and 2017, variables costs, labor costs, fixed costs, and average costs associated with organic farming. The fourth section, questions included in the questionnaire related to how research participants perceived organic agriculture, the financial support offered by the government, and the success of the business. This section consisted of two general questions, which sought to determine how the farmers perceived the benefits of organic farming from an environment and public health perspective.

The questionnaire contained open and closed-ended research questions. Closed-ended research questions aimed at ensuring the respondents provided answers specific to the study's focus, whereas open-ended ones were focused at giving participants the freedom to express their views on issues related to organic food (Bird, 2009). However, some closed-ended research questions

allowed the respondents to provide any information excluded in the predefined responses. Such options permitted the participants to provide specific answers to ensure the data gathered was related to the study. Also, the approach broadened the study's scope by ensuring the data analysis process included all relevant data.

3.6 Target Population

The study's target population consisted of 568 organic farms (Organic Council of Ontario Directory, 2014). Some of the farms were large-scale hence excluded from the target population. Accordingly, only small and medium-sized organic farms from Ontario were included in the analysis. The study focused on all organic farm products; thus, the selection process did not narrow its scope to specific farms, but all small and medium-sized. Additionally, the farms selected must have practiced organic farming between 2015 and 2017, which the study covered. The size for small farms ranged between one acre and 400 acres whereas that for medium-sized farms ranged between 401 acres and 1500 acres. Although farm status was essential to the current research, both certified farms and those in the transitional phase were eligible to participate in the study.

3.7 Data Collection

The process of collecting data from the 568 farms entailed emailing the farm managers requesting them to participate in the study. Few farm managers responded to the email, thus prompting the researcher to send hardcopy questionnaires to the non-responsive farms and those whose mail addresses were readily available from the public mail directory. The researcher sent out 80 questionnaires to different farms during stage one between October 16, 2018, and

November 15, 2018. To boost the response rate, the researcher sent out an additional 70 hardcopy questionnaires to other farms between November 29, 2018, and January 2, 2019. In addition, the researcher sent out 63 hardcopy questionnaires to other farms between December 20, 2018, and January 10, 2019. In the end, only 14 farms out of 568 filled and returned the questionnaires. Farms that failed to fill the hardcopy questionnaires did not provide reasons for that decision despite the researcher providing them with fully paid envelopes to issue feedback or submit complete forms.

Next, the researcher collaborated with the Canadian Organic Council and SurveyMonkey platform to increase the number of participants. SurveyMonkey provided an online platform for collecting data, whereas the Canadian Organic Council hosted the platform to allow organic farms from Ontario to fill the online questionnaire. The questionnaire was similar to the hardcopy sent to the farms and was hosted for one month by the Canadian Organic Council, during which 14 more farms filled the form, raising the total number of participants to 28. However, five of the questionnaires were partially filled hence excluded from the data analysis process. In this respect, the sample consisted of 23 organic farms, relatively few though sufficient for the current study.

3.8 Data Analysis

The first research question aimed to determine the profitability of small and medium-sized organic farms in Ontario. It presumed that the profitability of the two types of organic farms was significantly different to the extent that medium-sized farms were relatively more profitable than smaller ones. A Mann Whitney test was utilized to evaluate whether the difference between the mean profitability for the two types of farms were statistically different from each other (Salkind,

2010). The second research question sought to determine the influence of farm type on the profitability of organic farming in Ontario, with the researcher presuming that medium-sized farms were more profitable than small farms. The researcher evaluated the accuracy of this presumption using the Fisher's exact test to assess the level of association between farm type and its profitability. The test's null hypothesis presumed that farm profitability was independent of farm type, whereas the alternative hypothesis assumed that the two variables were dependent on each other. The Fisher's exact test was utilized because some of the cells had less than five expected frequencies.

Upon determining the profitability of small and medium-sized organic farms and the association between farm type and profitability, the third research question sought to determine whether large organic farms could take advantage of economies of scale to boost their profitability contrary to the small farms. Given that the third research question was derived from the first two questions, it was answered based on the responses obtained from the two queries. On the other hand, the fourth research question sought to evaluate the challenges organic farmers in Ontario faced in accessing sustainable and healthy organic food systems as they maximize their socio-economic development. The researcher answered this general question using the qualitative data provided by the respondents.

The first null hypothesis theorized that there lacked a statistically significant association between farm type and its level of profitability. As such, the researcher conducted a Fisher's exact test to evaluate the validity of this hypothesis and determine whether and to which extent farm profitability was dependent on farm type. The alternative hypothesis presumed that farm profitability depended on farm type, implying that the profits made by organic farms in Ontario depended on farm type. The implication was that medium-sized farms were likely to record

relatively higher returns than small-sized farms. The second null hypothesis presumed that large organic farms could not take advantage of economies of scale to capitalize on their high external input and high output production abilities to grow their profits more than the small-scale farms. Since the hypothesis was derived from the first one, the results obtained from the Fisher's exact test helped to determine the truthfulness of this theory.

The study utilized a significance level of five percent throughout the analysis to evaluate the hypotheses. The decision rule was that the null hypotheses should be rejected for p-values less than 0.05 in favor of their alternative hypotheses. In contrast, the null hypotheses were retained if the p-values were greater than 0.05 (Creswell and Creswell, 2018). By keeping the null hypotheses, the study implied that the differences between the variables were not statistically significant, whereas rejecting the null hypotheses in favor of their alternative hypotheses suggested that the differences were statistically significant. The researcher utilized the Statistical Package for Social Scientist and Excel computer programs to analyze the quantitative data collected from research participants. The Statistical Package for Social Scientist program was utilized to perform cross-tabulation and the Fisher's exact test, whereas the Excel program was employed to input the data and generate various types of charts used throughout the study.

A content analysis method that involved identifying themes from the responses that the respondents provided was utilized to analyze the qualitative data. The process entailed reading through the responses, classifying them into the categories that related to the study's objectives and research questions and combining the most related ones. The themes emerging from the categories were then picked and used to answer the research questions and achieve study's objectives. Multiple category classifiers that involved broadening the list of terms that the

respondents utilized throughout the data collection process were utilized to enhance the validity of the themes.

3.9 Ethical Considerations

The Laurentian University Research Ethics Board (REB) has approved this study The farms that took part in the study were recruited voluntarily; and refuse to participate or withdrawal or discontinue participation in the study will not result in any penalty or loss of benefits or rights to which might otherwise be entitled. Participants anonymity were maintained during data analysis and publication or presentation of results The participants were assigned a number as names of individuals/businesses will not be recorded; hence, none was forced to fill the hardcopy or online questionnaires sent. Throughout the data collection process, the researcher assured the farm managers that the data they provided would not be shared with unauthorized people. Additionally, the farm managers were assured that the data would be utilized for the current study and stored in padlocked cabinets or computer devices with robust, secure passwords. In line with this, the farm information that the farm managers provided was not utilized in report writing. Instead, the researcher used general statements to report the qualitative data.

3.10 Summary

Chapter three explains the methodology applied by the researcher to examine and study the topic. It describes the research design that uses casual-comparative study design to assess the extent to which farm type influences profitability. Pragmatic research philosophy used to apply qualitative method with participants observation. This approach helps to employ combined

qualitative and quantitative data to determine the extent to which farm type influenced the profitability of the organic farm in the province. The chapter also provides the research hypothesis to answer the research questions and ensure the entire research methodologies are scientific and valid. This research utilized the questionnaire containing farm-related information, general question, financial information and environment and public health-related information. The questionnaire consists of open and closed-ended research questions. The target population is 568 small and medium-sized farms. The collecting data method used mailing hardcopy questionnaires then made it available through the SurveyMonkey online platform by coordinating with the Organic Council of Ontario. The researcher used SPSS to perform cross-tabulation and Mann-Whitney U, Fisher's exact tests and in addition of excel program for the data to be analyzed to achieve the study's objectives.

CHAPTER FOUR: SOCIOECONOMIC CHARACTERISTICS OF ORGANIC FARMS IN ONTARIO

4. Descriptive Statistics

4.1 Organic farms

The analysis included 23 organic farm companies, out of which 78 percent of them were certified as organic whereas 22 percent were transitional status. 36 percent managed by females, and about 61 percent by male while 3 percent failed to specify their manager's gender. Largely, the findings were in agreement with Organic Council of Ontario (n.d) that claims that over 50 percent of the farms in Ontario have been certified over the last ten years. Additionally, they were in agreement with Schumilas (2012) who claims that majority of the organic farms in Ontario are certified whereas few of them are in transitional status. About 39 percent of the farms analyzed were sole proprietors, 32 percent were partnerships, and 18 percent were family-owned, whereas non-family members owned 11 percent. Most of the farms, being small-scale and medium-sized, had between one and ten full-time employees.

4.2 Respondents' age

About 11 percent of the managers were aged between 20 and 29 years, 7 percent were aged between 30 and 39 years, 29 percent were aged between 40 and 49 years, and 29 percent were aged between 50 and 59 years. In addition, about 14 percent of the managers were aged between 60 and 69 years, 7 percent were aged over 70 years, whereas approximately 4 percent failed to specify their manager's age bracket.

4.3 Reasons for engaging in organic farming

Majority of the farms claimed that they engaged in organic farming because of health and environment concerns. Those highlighting health concerns claimed that they intended to provide the members of the public with healthy foods whereas those citing environment concerns claimed that they wanted to reduce pesticides, take care of the soil and benefit biodiversity in different ways. Only 13 percent of the farms claimed that they engaged in organic farming as a business venture. The findings were in agreement with Rigby and Caceres (2001) who claim that majority of the Canadian farmers are influenced by health and environmental concerns and that very few of them are influenced by the profitability of organic farming. Additionally, they were in agreement with Anon (2012) who indicated that the pioneers of organic farming were influenced by the long-term vitality of the environment and the health of the people.

4.4 Land allocation

From 2015 and 2017, small-scale farms allocated between one and 400 acres of land to organic farming, whereas the medium-sized farms allotted between 401 and 1500 acres. About 57 percent of the farms identified their organic farming as profitable, and 17 percent recorded loss, whereas 26 percent identified as neither profitable nor losses. Figure 4.1 summarizes the profitability of the farms as perceived by the respondents.

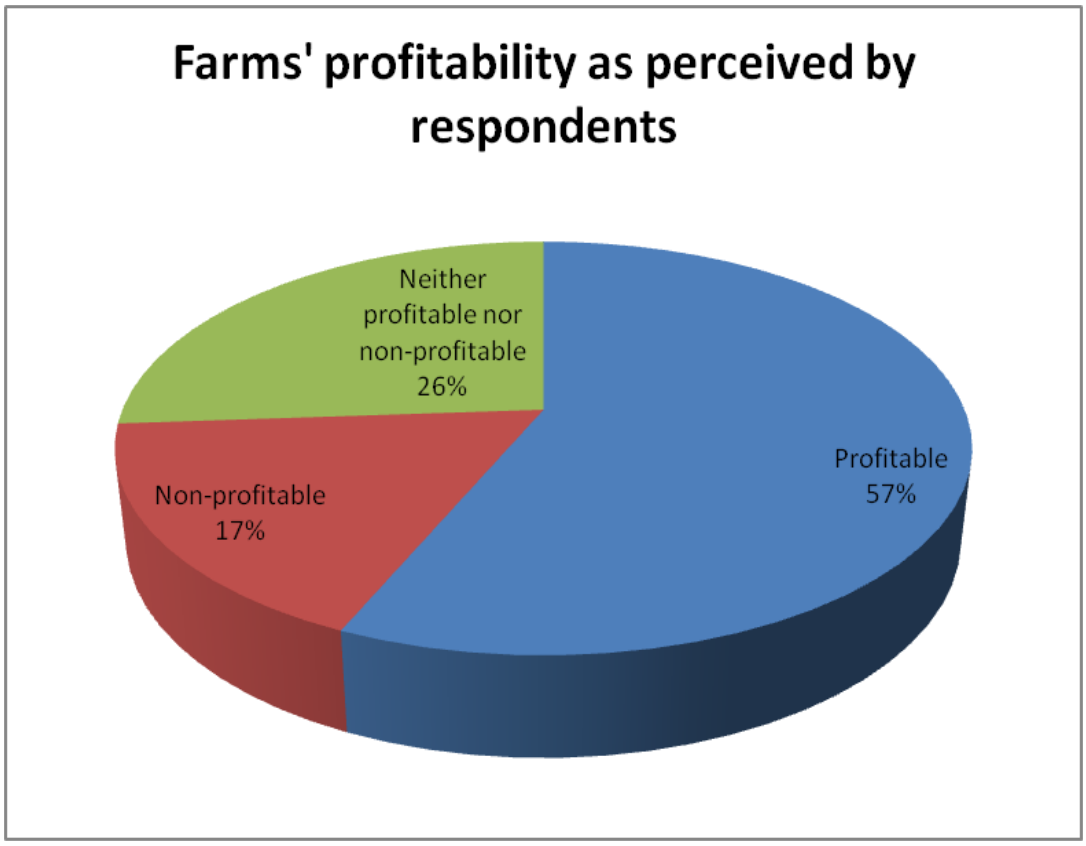


Figure 4.1: Farms' profitability as perceived by the respondents by the end of 2017.

About 78 percent of the participants classified the success of their farms as average, while 13 percent stated below success, 5 percent as very successful, and another 4 percent as unsuccessful. Figure 4.2 summarizes the success of the farms as perceived by the respondents.

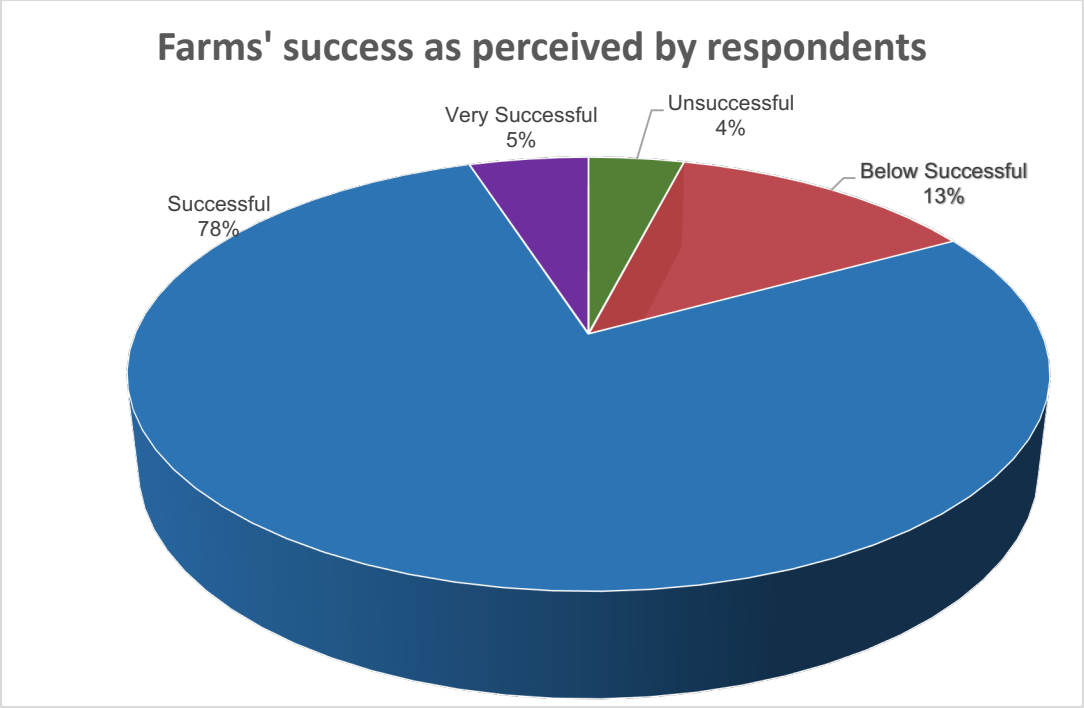


Figure 4.2: Farms' average success as perceived by the respondents by thed of 2017.

Despite describing their ventures as unsuccessful, only 17 percent of the farms included in the analysis indicated that they received support from the government. The rest, 83 percent, claimed that their farms did not receive direct support from the government, as illustrated in Figure 4.3.

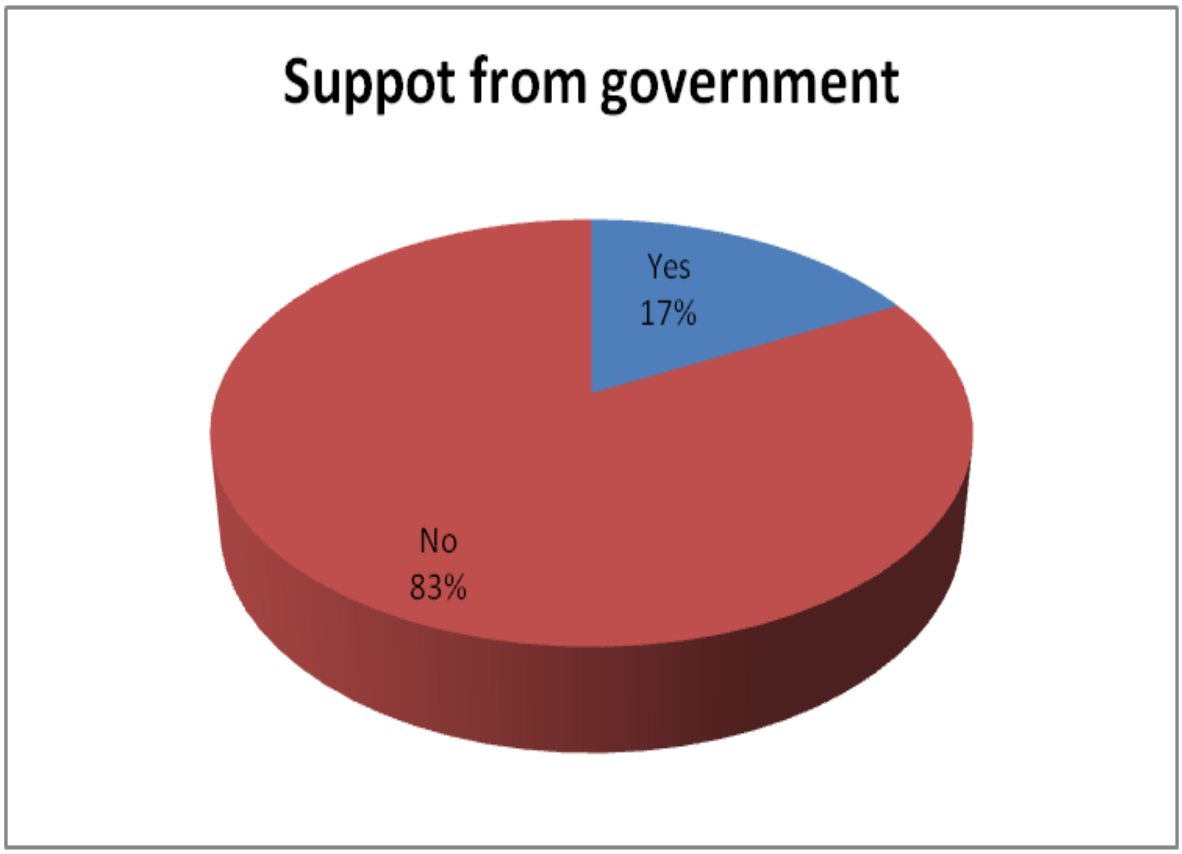


Figure 4.3: Farms receiving support from the government.

Further analysis showed that only 14 percent of the medium-sized farms received financial support from the government either in subsidies or in other programs. In contrast, only 19 percent of small-scale farms received such aid from the government, as depicted in Table 4.1. Accordingly, about 86 percent of medium-sized farms and 81 percent of small-scale farms did not receive support from the government.

			Support		Total
			No	Yes	
Farm	Medium	**Count**	**6**	**1**	**7**
		% Within farm	85.7%	14.3%	100.0%
	Small	**Count**	**13**	**3**	**16**
		% Within farm	81.2%	18.8%	100.0%
Total		**Count**	**19**	**4**	**23**
		% Within farm	82.6%	17.4%	100.0%

Table 4.1: Farms receiving support from the government segregated by their type.

Nevertheless, even if 4 percent of participants were unsure whether the government was supposed to subsidize organic farming or offer any support to organic farmers, about 96 percent claimed that the government needed to support the venture. The majority of respondents claimed that the government should provide tax rebates, subsidize organic raw materials, and develop policies to enhance organic farming.

Other participants argued that the government should improve the supply chains to boost the market for organic products, whereas others cited the need for financial support, among other assistance methods. One farm did not indicate the extent to which people living in the immediate neighborhood, region, or country supported organic farming by purchasing the products. However, about 30 percent of the respondents claimed that people living in nearby areas supported their organic farming fully. About 13 percent of the participants claimed that

immediate regions supported 90 percent of their agriculture, whereas 13 percent stated that people living in nearby areas supported ten percent of their venture. The results showed that majority of people living near the farms bought organic farm products from their farms. Nevertheless, very few of the people from the province and country at large bought organic farm products from the farms included in the analysis.

Out of the 23 farms that provided their financial details for the years 2015 to 2017, 9 percent made zero profits, whereas 35 percent made losses in 2015. As a result, only 56 percent of the farms recorded gains in 2015. Two of the farms made approximately C$500 in profits, which is significantly low. The farms recorded a similar trend in 2016. In 2017, the percentage of farms that made profits rose to 65 percent; however, the number of farms that registered losses remained 35 percent. Accordingly, the 2017 profits were meager because most of the farms recorded losses in 2015 and 2016.

4.5 Summary

Chapter four will continue discussing the collected data related to the socioeconomic section of organic farms in the Province of Ontario. It includes descriptive statistics elements such as the age of the participants, reasons for doing organic farming, land allocated, farms' profitability as perceived by respondents, farms' success as perceived by respondents, and whether farms receive any support from the government. The researcher also assessed the supply chain by indicating the areas that people living in the immediate neighbourhood, region, or country support organic farming by purchasing the products.

CHAPTER FIVE: FARMS' PERFORMANCE (SALES AND PROFITABILITY)

5.1 Sales Analysis

The researcher evaluated the sales yearly to illustrate the farms' performance between 2015 and 2017. The results showed that in 2015, six farms recorded gross sales of between zero and C$15,000. However, the two farms sold nothing, implying they did not produce any marketable product. Seven of the farms recorded gross sales of between C$15,001 and C$50,000, as shown in Figure 5.1 Similarly, seven other farms recorded gross sales of between C$50,001 and C$250,000. Two farms made gross sales of between C$250,000 and C$500,000, whereas one farm had gross sales of between C$500,001 and C$750,000, as Figure 5.1 depicts.

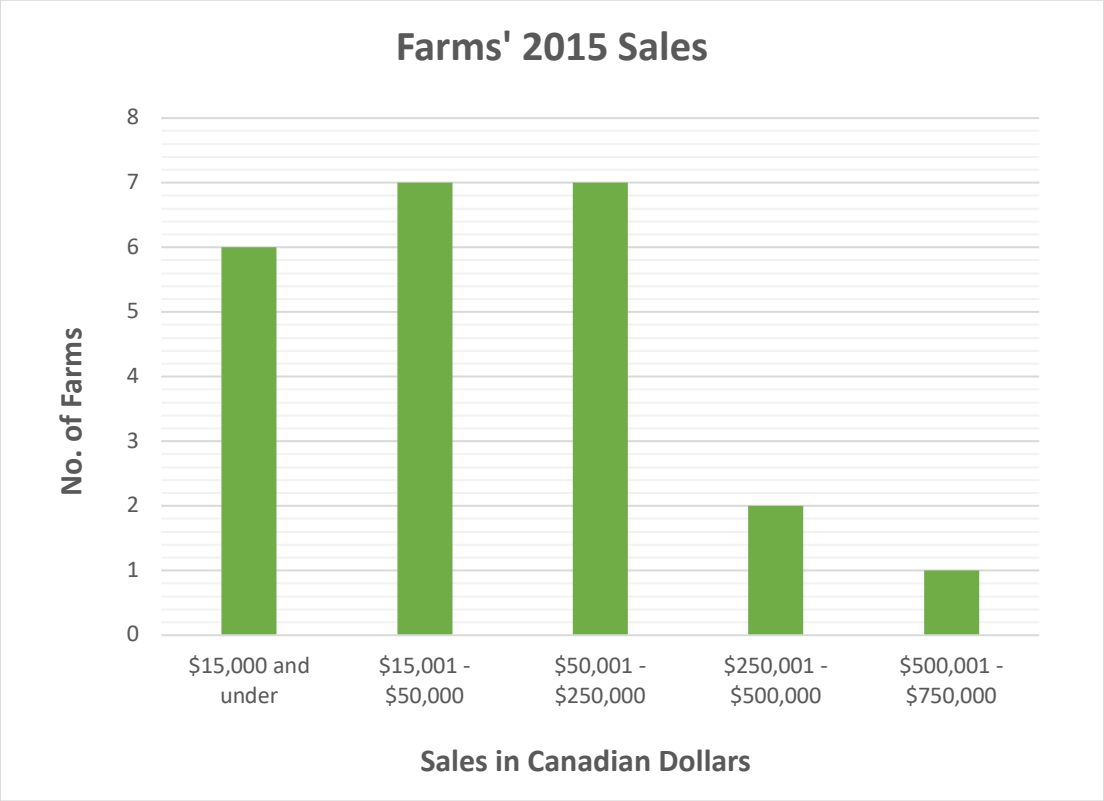


Figure 5.1: The farms' 2015 sales.

In 2016, the number of farms with gross sales of between zero and C$15,000 remained at six. Farms that made gross sales of between C$15,001 and C$50,000 reduced from seven to six, suggesting that one farm recorded increased sales. The quantity of farms with gross sales of between C$50,001 and C$250,000 rose from seven to nine, suggesting that one farm with higher gross sales in 2015 reduced its sales in 2016. Thus, despite the farms included in the analysis operating independently, the gains made by one farm in 2016 were nullified by the losses recorded by the other. Given this, only one farm recorded gross sales of between C$250,001 and C$500,000 in 2016. Similarly, one farm made gross sales of between C$500,001 and C$750,000 in 2016, as Figure 5.2 depicts.

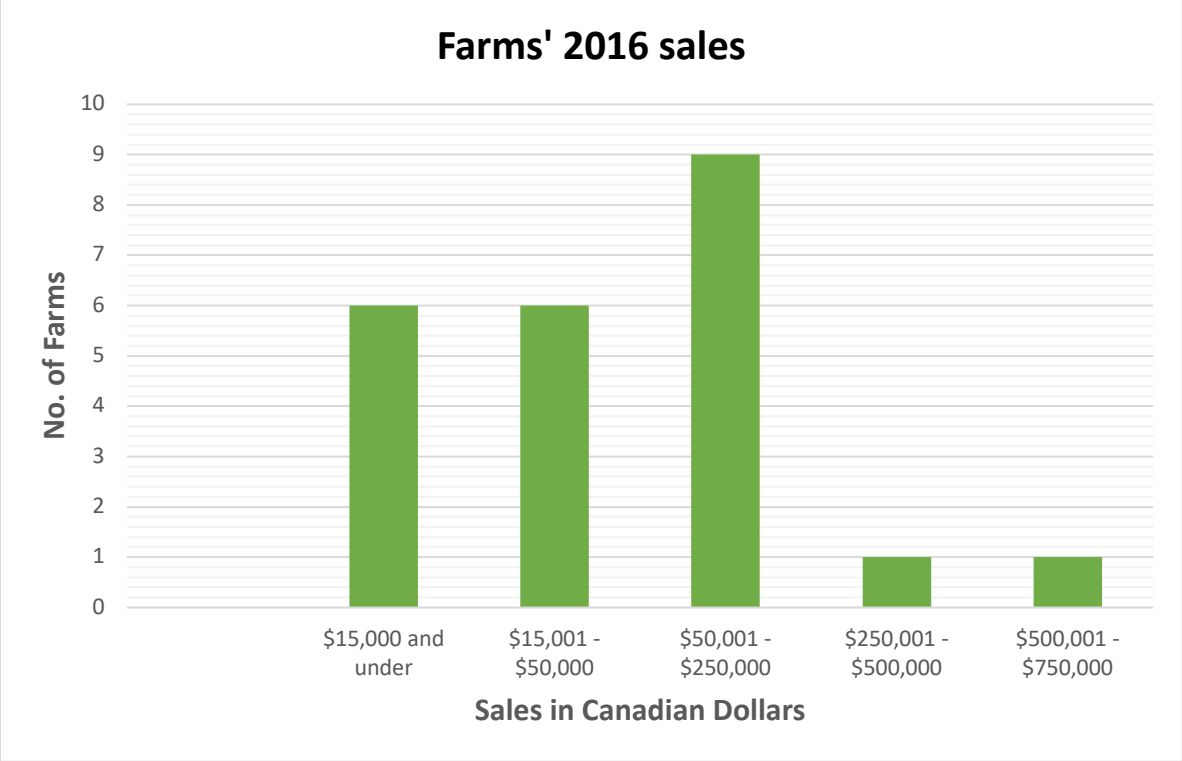


Figure 5.2: The farms' 2016 sales.

In 2017, the farms' gross sales changed slightly, but the number of farms with gross sales of between zero sales and C$15,000 reduced to five, suggesting that one farm improved its sales and, to some extent, its profitability. As a result, the number of farms with gross sales of between C$15,001 and C$50,000 rose to seven. A similar improvement trend was recorded among the farms that made gross sales between C$50,001 and C$250,000, suggesting that one of the farms increased its sales in 2017. As a result, the number of farms with gross sales of between C$250,001 and C$500,000 rose to two, like in 2015. Nonetheless, farms that made gross sales between C$500,001 and C$750,000 remained at one, similar to 2015 and 2016, as shown in Figure 5.3.

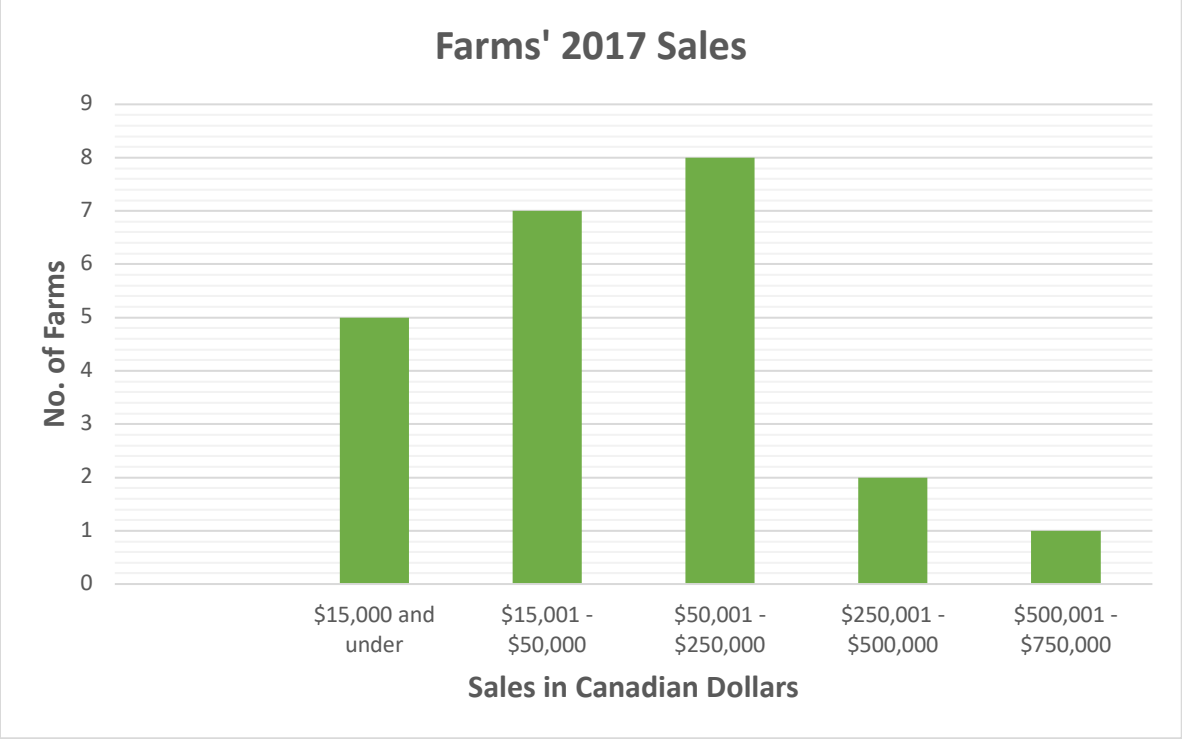


Figure 5.3: The farms' 2017 sales.

5.2 Farms' performance

The sales analysis provided the percentage gross sales but failed to illustrate how medium and small-sized farms performed. The researcher conducted cross-tabulation using the Statistical Package for Social Scientist program (SPSS) to depict the gross sales for the two types of farms between 2015 and 2017. The results showed that 13 percent of the small-scale farms did not sell anything in 2015, suggesting that the two farms recording between zero and C$15,000 sales in that year were small-scale. In addition, the results showed that 14 percent and 19 percent of medium-sized and small-scale farms, respectively, recorded gross sales of less than C$15,000, suggesting an association between farm type and gross sales at this level. The results also showed that 14 percent of medium-sized farms and 37 percent of small-scale farms recorded gross sales of between C$15,001 and C$50,000 in 2015. Furthermore, 43 percent of medium-sized farms and 25 percent of small-scale farms had gross sales of between C$50,001 and C$250,000. The results imply that medium-sized farms had higher gross sales than small-scale farms in 2015, as depicted in Table 5.1

			Sales (2015)						Total
			No Sales	15,000 and Under	15,001 – 50,000	50,001 - 250,000	250,001 - 500,000	500,001 - 750,000	
Farm	Medium	**Count**	**0**	**1**	**1**	**3**	**1**	**1**	**7**
		% Within farm	0%	14.3%	14.3%	42.9%	14.3%	14.3%	100%
	Small	**Count**	**2**	**3**	**6**	**4**	**1**	**0**	**16**
		% Within farm	12.5%	18.8%	37.5%	25.0%	6.2%	0.0%	100%
Total		**Count**	**2**	**4**	**7**	**7**	**2**	**1**	**23**
		% Within farm	8.7%	17.4%	30.4%	30.4%	8.7%	4.3%	100%

Table 5.1: Cross-tabulation between farms' gross sales and size of farm in 2015

A further analysis was conducted to depict how the farms performed in 2016. The results showed that about 13 percent of small-scale farms did not sell anything. In addition, the results showed that 14 percent and 19 percent of medium-sized and small-scale farms, respectively, had gross sales of less than C$15,000. In addition, the results showed that 14 percent of medium-sized farms and 31 percent of small-scale farms recorded gross sales of between C$15,001 and C$50,000. Lastly, 43 percent of medium-sized farms and 37 percent of small-scale farms had gross sales of between C$50,001 and C$250,000, as shown in Table 5.2. The analysis results

implied that the gross sales for medium-sized farms were relatively higher than the small-scale farms' in 2016.

			Sales (2016)						Total
			No Sale	15,000 and Under	15,001 – 50,000	50,001 - 250,000	250,001 - 500,000	500,001 - 750,000	
Farm	Medium	**Count**	**0**	**1**	**1**	**3**	**1**	**1**	**7**
		% Within farm	0.0%	14.3%	14.3%	42.9%	14.3%	14.3%	100.0%
	Small	**Count**	**2**	**3**	**5**	**6**	**0**	**0**	**16**
		% Within farm	12.5%	18.8%	31.2%	37.5%	0.0%	0.0%	100.0%
Total		**Count**	**2**	**4**	**6**	**9**	**1**	**1**	**23**
		% Within farm	8.7%	17.4%	26.1%	39.1%	4.3%	4.3%	100.0%

Table 5.2: Cross-tabulation between farms' gross sales and size of farm in 2016.

In addition, the study involved analysis in determining how farms performed in 2017. The results showed that 31 percent of small-scale farms had gross sales of less than C$15000, with zero medium-sized farms recording such sales. These same results showed that 29 percent of medium-sized farms and 31 percent of small-scale farms had gross sales of between C$15,001 and C$50000, whereas 29 percent and 37 percent medium-sized and small-scale farms, respectively, recorded gross sales of between C$50,001 and C$250,000. In contrast, 29 percent

of medium-sized farms had gross sales of between C$250,001 and C$500000, with zero small-scale farms recording such sales. Additionally, 14 percent of medium-sized farms had gross sales of between C$500,001 and C$750000, with zero small-scale farms recording such sales as depicted in Table 5.3. The 2017 gross sales results showed an association between farm type and gross sales.

			Sales (2017)					**Total**
			15,000 and Under	15,001 - 50,000	50,001 - 250,000	250,001 - 500,000	500,001 - 750,000	
Farm	Medium	**Count**	**0**	**2**	**2**	**2**	**1**	**7**
		% Within farm	0.0%	28.6%	28.6%	28.6%	14.3%	100.0%
	Small	**Count**	**5**	**5**	**6**	**0**	**0**	**16**
		% Within farm	31.2%	31.2%	37.5%	0.0%	0.0%	100.0%
Total		**Count**	**5**	**7**	**8**	**2**	**1**	**23**
		% Within farm	21.7%	30.4%	34.8%	8.7%	4.3%	100.0%

Table 5.3: Cross-tabulation between farms' gross sales and size of farm in 2017

5.3 Cost Analysis

The labor costs and farm input-related costs are the main costs for both small and medium-sized organic farms in the Ontario. The analysis established that majority of them hire between 1 and

10 part-time and full-time employees to work on the farms. The labor costs for most of the farms included in the analysis ranged between 10 and 50 percent of the farms' total input.

5.4 Profitability Analysis

5.4.1 Mann Whitney Test

To determine whether the profitability means for small-sized farms were significantly different from the medium-sized farms between 2015 and 2017, the actual profits were calculated for each farm. Then the Mann Whitney test was conducted to determine whether they were statistically different from each other or not. Farm type with two levels, small and medium, was the independent variable, whereas farm profitability for 2015, 2016, and 2017 was the dependent variable. The null hypothesis hypothesized that the profitability for both types of farms was not statistically different from each other whereas the alternative one hypothesized that they were different from each other. Table 5.4 provides the descriptive statistics for the farms' profitability in 2015.

	Farm Type	**N**	**Mean Rank**	**Sum of Ranks**
Profitability for 2015	Small	16	12.16	194.50
	Medium	7	11.64	81.50
	Total	23		

Table 5.4: Farm's profitability descriptive statistics for 2015

Table 5.5 shows that the small-sized farms had higher profits than the medium-sized ones. The study, however, did not establish any statistically significant difference between the two groups (U = 53.5, p = 0.871) because the p-value (0.871) was greater than 0.05 at Table 5.5 depicts.

	Profit 2015
Mann-Whitney U	53.500
Asymp. Sig. (2-tailed)	.867
Exact Sig. [2*(1-tailed Sig.)]	.871

a. Grouping Variable: Type Farm

Table 5.5: The statistic table for 2015

A similar analysis was conducted for 2016. The null hypothesis hypothesized that the profitability for both types of farms was not statistically different from each other whereas the alternative one hypothesized that they were different from each other. Table 5.6 provides the descriptive statistics for the farms' profitability in 2016.

	Farm Type	**N**	**Mean Rank**	**Sum of Ranks**
Profitability for 2016	Small	16	12.28	196.50
	Medium	7	11.36	79.50
	Total	23		

Table 5.6: Farm's profitability descriptive statistics for 2016

Table 5.6 also shows that the small-sized farms had higher profits (196.50) than the medium-sized ones (79.50). The study, however, did not establish any statistically significant difference

between the two groups (U = 51.5, p = 0.769) because the p-value (0.769) was greater than 0.05 at Table 5.7 depicts.

	Profit 2016
Mann-Whitney U	51.500
Asymp. Sig. (2-tailed)	.763
Exact Sig. [2*(1-tailed Sig.)]	.769

a. Grouping Variable: Type Farm

Table 5.7: The statistic table for 2016

A further analysis was conducted for 2017. Table 5.8 provides the descriptive statistics for the farms' profitability in 2017.

	Farm Type	**N**	**Mean Rank**	**Sum of Ranks**
Profitability for 2017	Small	16	11.34	181.50
	Medium	7	13.50	94.50
	Total	23		

Table 5.8: Farm's profitability descriptive statistics for 2017

Table 5.8 further shows that the small-sized farms had higher profits (181.50) than the medium-sized ones (94.50). The study, however, did not establish any statistically significant difference between the two groups (U = 45.5, p = 0.492) because the p-value (0.492) was greater than 0.05 at Table 5.9 depicts.

	Profit 2017
Mann-Whitney U	45.500
Asymp. Sig. (2-tailed)	.482
Exact Sig. [2*(1-tailed Sig.)]	.492

a. Grouping Variable: Type Farm

Table 5.9: The statistic table for 2017

The study concluded that the farm profitability for both types of farms was not statistically different from each other for the three years considered in the analysis.

5.4.2 Cross-Tabulation and Fisher's Exact Tests

To determine the level of association between farm profitability and farm type, cross-tabulation and Fisher's exact test were conducted to evaluate whether the two variables were related. The process involved calculating the average profits for each farm for the three years included in the study and labeling them as either profitable, loss, or neither profit-nor loss based on the amount obtained from the analysis. The outcomes showed that 57 percent of medium-sized and 25 percent of small-scale farms made losses in 2015. Additionally, the results showed that 12 percent of small-scale farms made neither losses nor profit in 2015, whereas 43 percent of medium-sized and 63 percent of small-scale farms made profits in 2015, as Table 5.10 depicts.

			Profit 2015			Total
			Loss	Neither Profit-Nor Loss	Profit	
Farm	Medium	**Count**	**4**	0	**3**	**7**
		% Within farm	57.1%	0.0%	42.9%	100.0%
	Small	**Count**	**4**	**2**	**10**	**16**
		% Within farm	25.0%	12.5%	62.5%	100.0%
Total		**Count**	**8**	**2**	**13**	**23**
		% Within farm	34.8%	8.7%	56.5%	100.0%

Table 5.10: Cross-tabulation between farms' profitability and farm type in 2015

A Fisher's exact test was conducted to assess whether the level of profitability between the two types of farms was statistically different from each other. The null hypothesis presumed that farm profitability was independent of farm type, whereas the alternative hypothesis assumed a dependent association. The Fisher's exact test did not establish farm profitability as dependent on farm type because the test's p-value (.312) was greater than 0.05 (see Table 1 at the appendix). As a result, the null hypothesis was retained, and the study concluded that the profitability of the two types of farms did not depend on farm type. The study concluded that both medium-sized and small-sized farms could have made losses in 2015. Similarly, both types of farms could have made profits in 2015 because farm profitability did not depend on farm type.

A further analysis was conducted to evaluate the level of association between farm profitability and farm type in 2016. The outcomes showed that the level of profitability between the two types of farms remained relatively the same. The percentage of medium-sized and small-scale farms that made losses in 2016 remained at 57 percent and 25 percent, respectively. Similarly, 13 percent of small-scale farms did not make losses or profit in 2016, like in 2015. Also, 43 percent of medium-sized farms and 63 percent of small-scale farms made profits like in 2015, as shown in Table 5.11.

			Profit 2016			**Total**
			Loss	Neither Profit-Nor Loss	Profit	
Farm	Medium	**Count**	**4**	**0**	**3**	**7**
		% Within farm	57.1%	0.0%	42.9%	100.0%
	Small	**Count**	**4**	**2**	**10**	**16**
		% Within farm	25.0%	12.5%	62.5%	100.0%
Total		**Count**	**8**	**2**	**13**	**23**
		% Within farm	34.8%	8.7%	56.5%	100.0%

Table 5.11: Cross-tabulation between farms' profitability and farm type in 2016

The Fisher's exact test was conducted to assess whether the level of association between the two variables was statistically different. The test did not establish farms' profitability as dependent on

farm type because the test's p-value (.312) was greater than 0.05 (see Table 2 at the appendix). As a result, the null hypothesis presuming that farm profitability was independent of farm type was retained, and the study concluded that the profitability of the two types of farms was independent on the farm type in 2016. As such, both medium-sized and small-scale farms could have made losses in 2016. Additionally, both farm types could have recorded profits in 2016.

A similar test was conducted for 2017 to evaluate the association between the two types of farms and their profitability. The findings showed that 43 percent of medium-sized farms and 31 percent of small-scale farms made losses in 2017. Also, 57 percent of medium-sized farms and 69 percent of small-scale farms made profits, as shown in Table 5.12.

			Profit 2017		**Total**
			Loss	Profit	
Farm	Medium	**Count**	**3**	**4**	**7**
		% Within farm	42.9%	57.1%	100.0%
	Small	**Count**	**5**	**11**	**16**
		% Within farm	31.2%	68.8%	100.0%
Total		**Count**	**8**	**15**	**23**
		% Within farm	34.8%	65.2%	100.0%

Table 5.12: Cross-tabulation between farms' profitability and farm type in 2017

The researcher conducted a Fisher's exact test to determine whether the level of profitability between the two types of farms was statistically different. The null hypothesis presumed that farm profitability was independent of farm type, whereas the alternative hypothesis assumed a dependent association. The Fisher's exact test did not establish farm profitability as dependent on farm type because the test's p-value (.657) for two-sided was greater than 0.05 (see Table 3 at the appendix). In the end, the null hypothesis was retained, and the study concluded that the profitability of the two types of farms did not depend on farm type. The implication was that medium-sized farms could make losses like small-scale farms in 2017. Similarly, both types of farms could register profits in 2017 because farm profitability did not depend on farm type. As such, both medium and small-scale organic farms in Ontario faced profitability challenges. The two types of farms recorded profits and losses between 2015 and 2017. Therefore, it was difficult to predict whether they would make either losses or profits in the future. Table 5.13 summarizes the number of farms that made losses/profits between 2015 and 2017.

	2015			**2016**			**2017**		
	Profit	Loss	Neither Profit-Nor Loss	Profit	Loss	Neither Profit-Nor Loss	Profit	Loss	Neither Profit-Nor Loss
Small - sized farms	10	4	2	10	4	2	11	5	0
Medium-sized farms	3	4	0	3	4	0	4	3	0

Table 5.13: Farms' profits/losses between 2015 and 2017

5.4.3 Qualitative Data Analysis

Most of the farms analyzed claimed that they engaged in organic farming because of health and environment concerns, high-quality produce, and better food choices for consumers. Other managers cited that organic farming enhanced soil sustainability, boosted the well-being of their families, and fulfilled their personal goals. However, some managers claimed that they pursued organic farming because they wanted to raise their incomes and enhance their cash flows, whereas others cited it was a business opportunity that required low investment and produced high yields. Given this, it was evident that while most farms engaged in organic farming for reasons like health and the environment, some considered it a business venture. Accordingly, there was a need for organic agriculture to be profitable to sustain such farms and contribute to human development.

Despite the meager support that the respondents received from the government, the majority of them believed that organic farming could improve soil content by boosting its organic matter, water retention rate, and reduce soil erosion. In line with this, one of the participants claimed that organic farming could develop a new type of soil and enhance the deep root system without altering soil layers. Another respondent argued that organic farming increased soil organic matter and boosted soil life, whereas another stated that it could improve the soil aggregate structure. Another one claimed that organic agriculture could enhance the quality of soil by adding organic materials. Regarding environment conservation, most participants asserted that organic farming was critical at minimizing the use of pesticides and herbicides that were destructive to the surroundings. Given this, one respondent claimed that organic agriculture was essential at reducing pesticides that killed pollinators. Another participant argued that organic farming fixed problems that required the use of pesticides and herbicides instead of short-term remedies

applied in conventional agriculture that expose the public to more significant risks. Other respondents believed that organic farming was critical at reducing synthetic fertilizer usage, which was destructive to the environment.

Additionally, organic farming was identified as critical at enhancing water absorption, improving soil quality, and reducing the rate of water pollution. Most of the respondents who claimed organic farming conserved the environment asserted that synthetic fertilizers were unnecessary as they harm the environment. As a result, one of the participants stated that organic farming was beneficial because hard chemicals harmful to the environment were not used. Another claimed that organic farming discouraged the use of toxic pesticides, thereby does not poison the environment. Another respondent argued that the crop rotation method applied in organic agriculture was critical because it improved soil quality without adding inorganic materials to the soil. As an illustration of how organic farming contributed to reducing water pollution, one of the respondents asserted that there were no toxic runoffs from organic farming hence protecting lakes, rivers, and other water points. A similar response was shared by another participant who claimed that pesticides and harmful chemicals did not drain into rivers and streams. As a result, the participants identified organic farming as a protector of the environment and booster of soil quality.

The respondents claimed that organic farming was beneficial because it provided consumers with healthier foods that boosted their immunity levels. In line with this, one of the participants asserted that their farm embraced organic farming about ten years ago because it was beneficial for their health and did not use poisonous chemicals to kill pests. Another respondent argued that their farm embraced organic farming because it improved the wellness of their customers by minimizing health-related problems. Another participant asserted that despite not being a health

expert, they had observed an improvement in the animals reared organically. Additionally, one respondent claimed that organic farming was critical because it reduced the risks of various illnesses. In support of the importance of organic agriculture to families, another participant stated that organic food products were healthier than conventional ones, which contained high levels of chemicals.

Some respondents believed that avoiding the use of harmful chemicals in organic farming was critical because it protected consumers from lifestyle diseases such as cancer. In line with this, one of the participants claimed that avoiding synthetic pesticides and herbicides reduced incidences of cancer among the public. A similar response was shared by another respondent who stated that families that consumed organic farm products had managed gut problems, arthritis, and cancer, among other food-related issues. Another participant asserted that families that consumed organic food products were not exposed to harmful chemicals. Despite the many benefits of organic farming, some of the respondents stated that there lacks adequate dissemination of such information to the public, resulting in few people consuming organic produce. Accordingly, the participants identified the need to educate the public about the importance of organic food products to their bodies and the environment.

5.5 Summary

The five-chapter presents the study's findings related to the organic farm, while the

The researcher assessed the sales for three years (2015 – 2017) to demonstrate the farms' performance. In this chapter, the gross sales showed the analysis trend of the improvement recorded among the organic farms from 2015 to 2017. The researcher also conducted cross-tabulation using SPSS to illustrate the gross sales for the two types of farms that how medium and small-sized farms performed between 2015 and 2017. The Mann-Whitney test was applied

to determine whether the profitability means for small-sized farms were significantly different from the medium-sized farms between 2015 and 2017. The study established that the farm profitability for both types was not statistically different; from each other for the three years, which was considered in the analysis. Then, the researcher conducted Cross-tabulation and Fisher's exact tests to determine the level of association between farm profitability and farm type. So, the null hypothesis was retained, and the study concluded that the profitability of the two types of farms did not depend on farm type. The implication was that medium-sized farms could make losses like small-scale farms in 2017. Similarly, both types of the farm could register profits in 2017 because farm profitability did not depend on farm type. As such, both medium and small-scale organic farms in Ontario faced profitability challenges. The two types of farms recorded profits and losses between 2015 and 2017. Therefore, it was difficult to predict whether they would make either losses or profits in the future. In the end, there were two broad questions regarding the health and environmental benefits using the qualitative data analysis approach.

CHAPTER SIX: DISCUSSION

6.1 Overview

The thesis sought to evaluate the profitability of organic farming in the province of Ontario by comparing and contrasting the productivity of small-scale and medium-sized farms. Although most Canadian farmers did not engage in organic agriculture because of its profitability, the thesis presumed that larger farms were more profitable than smaller ones. Accordingly, it was expected that medium-sized farms would be relatively profitable than small-scale farms, contributing positively to enhancing their production measures. In contrast, the thesis established that between 2015 and 2017, both small and medium-sized farms made either profits or losses. Although some medium-sized farms made huge losses, few recorded relatively higher returns than small-scale farms. The higher profits supported the presumption made throughout the study that medium-sized farms were somewhat profitable than small-scale farms. However, the thesis did not identify the profitability of medium-sized farms as being statistically different from that of small-scale farms.

Mainly, the non-significance of the findings could be linked to the few medium-sized farms and the relatively high number of small-scale farms included in the study. Although this may not necessarily be the cause for non-significance of the findings, the four medium-sized farms that made losses throughout the research negatively influenced the profitability of their counterparts included in the analysis. In contrast, the low number of small-scale farms that made losses did not affect heavily on the profitability of small-sized farms. As such, there would be a need to conduct similar studies with relatively higher sample sizes in the future. Doing so would evaluate whether the small sample size utilized in the thesis had adverse effects on its findings and contribute to the study area.

Further, the thesis did not establish any statistically significant association between farms' profitability and farm type between 2015 and 2017. Specifically, although medium-sized farms made relatively high profits than small-scale farms, as expected, the number of medium and small-scale farms that recorded neither losses nor earnings between 2015 and 2017 was not statistically significant. Therefore, both farms performed relatively similar, despite medium-sized farms earning moderately higher profits than small-scale farms. The implication was that medium-sized farms could make losses like the smaller ones between 2015 and 2017. Similarly, small-scale farms could record profits like medium-sized farms in the same period because farm profitability did not depend on farm type. Given that both types of farms made losses between 2015 and 2017, the thesis concluded that medium-sized farms in Ontario could not take advantage of economies of scale to expand their profitability contrary to small-scale farms. The results suggested that medium-sized farms could encounter diseconomies of scale in their processes of taking advantage of their economies scale. As a result, the researcher notes that it would be vital for the Canadian government to support organic farming.

The study findings were in agreement with Kendal (2014), who established that there was a considerable decrease in the income generated from organic farming despite higher conversions from conventional to organic farming. In line with Kendal (2014), the study established that many small and medium-sized farms in Ontario made losses, suggesting that their incomes were declining. In 2015 and 2016, the researcher found that about 57 percent and 25 percent of medium-sized and small-scale farms, respectively, made losses. Additionally, 13 percent of small-scale farms made nothing from organic farming in the same period. Although the percentage of medium-sized farms that recorded losses in 2017 decreased to 43 percent, the number of small-scale farms that made losses rose to 31percent in 2017 from 25 percent

witnessed in the previous two years. Many factors might have contributed to variation in the percentage of the farms that recorded losses from 2015 to 2017; however, a substantial portion of the farms in Ontario, small and medium-sized, continues to make losses.

To some extent, the study results contradicted the long-held assertion that large farms can withstand low-profit margins than small-sized farms because of their economies of scale, which enable them to produce products at relatively lower costs (Kendal, 2014). Although this might be false at times, small-scale farms could minimize costs to certain degrees, making relatively high profits. In spite of this, it was evident that most small-scale farms included in the analysis made profits that could only sustain business operations instead of enabling them to boost their farming practices. Therefore, there was a need for further government support for organic farming in Ontario beyond research and development (Padel, 2001). The support from the government would boost their farming practices hence increase produce without necessarily growing their farm sizes that were identified as a direct contributing factor to low profitability.

An in-depth analysis of the farms showed that whereas 57 percent of medium-sized farms made losses in 2015 and 2016, only 25 percent of small-scale farms recorded losses during that period. This finding was observed despite 13 percent of small-scale farms recording neither losses nor profits between 2015 and 2016. Also, the analysis showed that whereas 43 percent of medium-sized farms made losses in 2017, only 31 percent of small-scale farms recorded losses in that year. In line with Guthman (2014), the study results suggested that medium-sized farms are less likely to capitalize on economies of scale beyond certain levels because they incurred huge expenses managing crop diseases or promoting crop rotation, among other pertinent issues. Therefore, organic farming in the province might be suffering from diseconomies of scale to the extent that medium-sized farms would not manage to take advantage of their economies of scale.

If the government fails to support organic farmers in the province, some farmers with large farms might opt out of organic farming or engage in small-scale agriculture. While this issue might appear insignificant because it would affect individual farmers, it could reduce the supply of organic products in the province (Darnhofer et al., 2005). A reduction in the supply of organic products might enhance the profitability of the business because farmers could sell their products at relatively higher prices due to increased demand. However, the reduction in supply would lead to fewer people consuming organic products critical to their health. A reduction in the supply of organic products would affect the health of Canadians who prefer consuming healthy goods negatively (Milestad and Darnhofer, 2003). Additionally, it would be difficult to encourage other Canadians to consume organic farm products to boost their health. Accordingly, there is the need for the government to increase its support for organic farming in the province to enhance continuity. Otherwise, some of the farmers might abandon organic farming or engage in small-scale agriculture instead of continuing with large-scale farming, yet it is vital for human development in the region.

Nevertheless, the research findings were in disagreement with the Organization for Economic Co-operation and Development (2003), which claims that most small-scale organic farmers are forced to increase their production and farm capacity because of diseconomies of scale. In contrast to the Organization for Economic Co-operation and Development (2003), the thesis established that medium-sized farms could not take advantage of their economies of scale, suggesting that small-scale farms were not under pressure to convert into medium-sized farms. Nonetheless, small-scale farms, especially those making profits, could transform into medium-sized farms. However, the farms can record losses as opposed to boosting their profitability upon converting into medium-sized farms. Given that farm profitability in organic farming does not

depend on farm size, government support would be critical at enhancing their profits, thus sustainability. Although profitability should be a secondary focus, it enhances the sustainability of organic farming in Ontario. As a result, the government should devise methods to improve the profitability of organic agriculture to boost its sustainability.

6.2 Results' Implication

The thesis established that because the profitability of small and medium-sized organic farms in Ontario does not depend on farm size, there is a likelihood that medium-scale farms cannot capitalize on economies of scale to boost their profitability. While this might be insignificant to people unaware of the importance of organic products to human development, it suggests that most of the medium-sized farms may not produce much because of the challenges they encounter growing the produce. In such a case, the prices for organic products in Ontario and Canada might increase, thereby forcing people who consume such produce to incur additional costs (Hegeman, 2002). Such people might willingly cover the additional costs, but their abilities to purchase organic products at relatively high prices resulting from decreased supply might depend on various factors.

According to Minnesota State University (2016), the demand for organic products would depend on their price, the price of related products, consumer preferences, and consumers' annual incomes. If the prices of organic products increased due to the inability of large farms to take advantage of their economies of scale, there is a likelihood that the demand for such products may decrease considerably, especially if consumers are unable to purchase at high prices. The major implication would be poor health among Canadians as organic products would be expensive, especially for major consumers of such products (Karakowsky et al., 2008). In such a

case, the health of such people would be affected if forced to consume conventionally grown farm products produced using synthetic fertilizers and pesticides. The effects may be gradual, implying that they would not be noted in the short-run, but would impact the health of Canadians negatively in the long-run.

In addition, the few farms that engage in organic farming in Ontario would be unable to sell their products at competitive rates if the demand decreases due to high prices, thus affecting them economically. While this might appear as a market issue that would finally stabilize, its implications might be significant because some organic farmers might be forced to engage in other competitive practices such as conventional farming. Even if a decrease in supply resulted in high prices, which would be good for the farms, a decline in the demand for organic farm produce due to their high prices would mean that many Canadians do not consume the products, which are critical to their health (Reganold and Waltcher, 2016). The supply and demand shifts would impact the health of Canadians negatively; hence, there would be the need for the state to interfere to ensure that organic farming in Ontario remains relatively profitable for farmers, especially those with medium-sized farms. Otherwise, the business practice might be unviable for many farmers, including the well-established ones; hence, hinder the farms from attaining their pro-social and pro-environmental goals.

It would be imperative to observe that the advancement of the findings mentioned above would depend on the prices of related products, consumer preferences, and consumers' annual incomes. If the prices of conventional farm products reduce and organic products become highly costly, some consumers, especially those with low annual incomes and low preferences for organic products, might need to switch to conventionally grown farm products (Dobbs, 2012). Doing so might solve their immediate problems, especially those related to annual incomes, but would

threaten their health because they would consume unhealthy products that may expose them to lifestyle diseases (Reganold and Waltcher, 2016). Similarly, if the preferences for some of the consumers of organic products change due to high prices that may result from the farms' inabilities to take advantage of their economies of scale, some Canadians might be required to consume conventional farm products (Mendenhall et al., 2002). It might be challenging to determine the extent to which such eventualities might affect consumers' preferences and behaviors; nevertheless, relatively high prices for organic farm products might discourage specific groups of people from consuming the goods. As a result, people's health would be affected negatively due to their financial inabilities to purchase organic products at relatively high prices. Accordingly, given that only 14 percent of medium-sized farms and 19 percent of small-scale farms indicated that they received support from the government, the state would need to provide additional aid to organic farms in Ontario (Fairweather, 1999). Doing so would encourage farms to remain in the business and expand their practices without worrying much about their profitability, which would be critical in promoting good health among Canadian people.

Additionally, it is notable that medium-sized farms that engage in organic farming in Ontario might be unable to take advantage of their economies of scale to boost their profitability. Therefore, conventional farming practices that might result from such an eventuality could destroy the environment. Conventional farming practices could result in several adverse effects while filling the gap left by organic farming, which has numerous benefits to the environment. Wynen (2008) and Padel and Lampkip (2015) argue that organic agriculture conserves soil fertility and enables the soil to maintain higher organic content. The organic content reduces the rate of soil erosion and increases the concentration of carbon per hectare (Gattinger etal., 2012).

Lamers et al. (2011) add that since organic farming does not depend on synthetic herbicides and chemicals, it reduces water pollution and other types of contamination to the environment. Additionally, organic farming reduces the emission of greenhouse gases that result in global warming, among other adverse effects on the environment.

Therefore, it is noteworthy that should the government fail to focus significantly on supporting organic farming in Ontario, there is a high chance of conventional farming practices destroying the environment. At the outset, such conventional farming practices would be centered mainly on chemical-based pesticides and herbicides, which would pollute the environment, especially water points in the neighboring regions. Similarly, the methods would lead to the release of toxic chemicals that, although fight pests and weeds, would destroy the environment in the long-run. More importantly, the chemical-based pesticides and herbicides utilized in conventional farming practices would affect the health of Canadians negatively (Aertsens et al., 2009). Accordingly, if the Canadian government fails to support organic farming, which has been demonstrated throughout the thesis as being challenged by profitability, there are high chances of the state facing many challenges in the future. Some of the difficulties might be related to the citizens' health or the environment.

Furthermore, conventional farming practices could weaken the organic content of the topsoil in Ontario. Gattinger et al. (2012) indicate that weak topsoil is prone to soil erosion, which, as opposed to solving the food problem, would harm the environment further. Additionally, the conventional farming practices that result from reduced organic farming will increase the release of greenhouse gases into the air. Such adverse effects of conventional farming practices would impact the region and its people in the long run. Accordingly, there is the need to boost the

struggling organic farming practices because they fight some of the negative effects that the government could face in the future should sustainable farming lack financing.

The thesis established that most small and medium-sized farms analyzed hire less than ten people either on a part-time or full-time basis. In this case, if the Canadian government supports the farms in their profitability struggle, they might hire more workers due to increased funds for various farming practices. Doing so would increase employment opportunities in Ontario hence contribute to national development (Bakewell-Stone et al., 2008). Apart from creating employment opportunities, organic farming would have a multiplier effect in Ontario and the country. According to Leifeld and Fuhrer (2010), the multiplier effect would not only improve the profitability of the farms but also could boost their output, which would be critical in enhancing the health of Canadians. Furthermore, organic farming would contribute to rural development and improve the skills of people living in rural areas. Accordingly, beyond the health and environmental benefits Canadians would enjoy from organic farming, the additional national economic bene fits justify the need for the government to support organic agriculture in Ontario.

6.3 Thesis' Limitations

Despite the considerable implications of the research on organic farming in Ontario, the study faced several limitations that might limit the generalization of findings. Firstly, only 28 out of 568 organic farms participated and fill for survey and returned the hardcopy and online-based questionnaires, but five of them were incomplete; hence, they were excluded from the analysis. The small sample size was considered sufficient for the thesis, given the effort made to recruit the 23 farms. However, similar studies with relatively larger sample sizes would be essential to

evaluate some of the factors contributing to low profitability among medium and small-scale organic farms in Ontario. Doing so would contribute to determining the possible solutions to boost the profitability of organic farms in the province and Canada.

Secondly, the response rate was relatively low; thus, the researcher could not apply the sampling method to select the 23 participating farms. Although this limitation might appear insignificant, given that the 23 farms were willing to partake in the investigation, the study excluded 5 of the potential participants with vital information about losses or profits in the organic farming industry. Accordingly, it is highly likely that the findings are not representative of organic farming in Ontario; hence, ungeneralizable to all small and medium-sized organic farms in the province. As such, it would be vital to conduct similar studies in the future to either confirm or refute the thesis' findings. Doing so would provide accurate results on the profitability of small and medium-sized organic farms in the province and contribute towards enriching existing literature. Thirdly, it is noteworthy that the scope of the study was restricted to Ontario, Canada. Accordingly, despite the province being vital to organic farming in Canada, the study's findings cannot be generalized to Ontario and other regions in the country, but could help the state and potential farmers approximate the profitability of organic farming in Canada. Therefore, similar studies with larger sample sizes should be conducted in Canadian provinces to provide an overview of organic agriculture in the country.

Furthermore, the thesis could not match the number of small-sized farms that took part in the study with their medium-sized counterparts because of the farms' unwillingness to participate in the research. Although this was a minor challenge given that both types of farms were included in the data analysis process, the study's internal validity was threatened slightly (Salkind, 2010). As a result, there would be a need to conduct similar studies with larger numbers of farm types to

minimize the threat to internal validity. Doing so would enhance the generalization of the current findings to small and medium-sized organic farms in Ontario.

6.4 Summary

Chapter six discusses the results considering previous studies in three sections, including an overview, results' implication and Thesis' limitation. The overview section described the presumption of larger farms whether they were more profitable than smaller ones. They failed since both small and medium-sized farms made either profit or losses for the three years of the study. In addition, the profitability of the medium-sized did not identify statistically different from those small-scale farms. The thesis also did not establish any statistically significant association between farms' profitability and farm types between 2015 and 2017, which indicates that the medium-sized farms could occur losses like smaller ones between 2015 and 2017 and vice versa. As a result, it suggests that it would be vital for the Canadian government to support organic farming. The results implication section concentrated on the implication of the findings and how other factors could affect the profitability of organic farms, for example, the demand and supply of organic products by considering the price of related products, consumer preferences, and consumers' annual incomes. The study confronted several limitations including, a low number of participants. So, the response rate was relatively low. Moreover, the study was limited to the Province of Ontario, Canada. Furthermore, the study could not match the number of small-sized farms with medium-sized counterparts, which would suggest the necessity to conduct similar studies with large numbers of farm types to minimize the threat to internal validity.

CHAPTER SEVEN: CONCLUSION

7.1 Overview

Overview

The research evaluated the impact of profitability on organic farms in Ontario by comparing and contrasting the performance of small and medium-sized farms. The specific objectives included determining the profitability of small and medium-sized organic farms in Ontario and exploring the influence of farm type on the profitability of organic farming. Further goals included: evaluating whether medium-sized organic farms could take advantage of the economies of scale to expand their profitability contrary to what small farms could do; evaluating the challenges facing organic farmers in Ontario; formulating recommendations to enhance the profitability of organic farms in Ontario to enable them to achieve their pro-social and pro-environmental goals. The chapter completes the research by summarizing the main findings from each objective and conclusions drawn from each. Additionally, the thesis includes recommendations before highlighting the study's contribution to existing literature.

7.2 Research Objective 1: The Profitability of Small and Medium-Sized Organic Farms

7.2.1 Summary of the Findings

The first objective involved evaluating whether the profitability means for small and medium-sized organic farms in Ontario were statistically different for each other. Since size was presumed to influence the profitability of both types of farms, medium-sized farms were assumed to be more profitable than the small-scale ones; hence, their mean profitability was

expected to differ for the period between 2015 and 2017.The results showed that a relatively higher percentage of medium-sized farms sold more products than their small-scale counterparts between 2015 and 2017. In spite of this, the thesis established that mean profitability for both types of farms were not statistically different from each other, suggesting that they made relatively equal profits between 2015 and 2017. Additionally, the findings showed that a certain percentage of the farms, small and medium-sized, made losses during the same period.

7.2.2 Conclusion

The thesis concluded that profitability affects both small and medium-sized organic farms; hence, each of them could make losses and profits regardless of their size. Nonetheless, it is notable that many medium-sized farms are likely to make higher profits than small-scale farms and are more vulnerable to recording huge losses due to challenges affecting organic farming practices. Acknowledging this fact would be critical in appreciating the vital role of direct government support in boosting the profitability of organic farmers in Ontario. The support, in this case, could enable the farms to continue producing and selling organic goods to neighboring regions and the country; hence, boost the health of Canadians.

7.3 Research Objective 2: The Influence of Farm Type on Farm Profitability

7.3.1 Summary of the Findings

The researcher investigated the association between farm type and farm profitability of small and medium-sized organic farms in Ontario. The assumption was that a positive link between farm type and farm profitability exists. Accordingly, the expectation was that medium-sized farms would be relatively profitable than small-scale farms. In contrast, the study failed to establish any

association between farm type and farm profitability. As such, although medium-sized farms recorded slightly higher profits than small-scale farms, some registered losses. Similarly, although some of the small-scale farms registered gains, others recorded losses between 2015 and 2017, indicating that their levels of profitability did not necessarily depend on farm sizes. The findings contrasted with the long-held belief that large farms are relatively profitable than small ones.

7.3.2 Conclusion

The thesis concluded that both farms could make profits or losses because farm profitability did not depend on farm type or farm size. The implication was that even if farm size had a slight impact on the profitability of organic farms in Ontario, the influence was minimal. Accordingly, small-scale farms that convert into medium-sized farms can record either losses or profits. Alternatively, medium-sized organic farms that change into smaller ones can record either losses or gains. Although the finding contradicts a long-held belief that large farms are relatively profitable, it highlights the need for government support in organic farming, suggesting that the lack of aid might prompt some farmers to exit the practice. Doing so would impact the health of Canadians negatively because the supply for organic farm products would reduce significantly. While this might appear insignificant, some people who consume organic products might be forced to consume chemically grown produce, which would undermine their health. As such, there is a need for government to support small and medium-sized organic farms in Ontario. The support may not necessarily be financial because the farms need different kinds of aid. Instead, government aid could vary depending on each farm's requirements; hence, the need for further research to evaluate the farmer's requests.

7.4 Research Objective 3: The Possibility of Economies of Scale among Medium-Sized Farms

7.4.1 Summary of the Findings

From an economic perspective, the thesis presumed that medium-sized farms could capitalize on their high external input and high output production capabilities to expand their profitability better than small-scale farms. The presumption was that the farmers could use their farm sizes to produce more products at relatively lower costs than small-scale farms. The reduced cost of production would, in turn, boost the profitability of medium-sized farms. In contrast, the researcher failed to ascertain that medium-sized farms could exploit economies of scale to enhance profits better than their small-sized counterparts. The thesis determined that medium-sized farms could record losses in the process of taking advantage of their economies of scale hence result in diseconomies of scale.

7.4.2 Conclusion

The researcher concluded that medium-sized farms could not exploit their economies of scale automatically because they could also record losses, like small-scale farms. Acknowledging this fact helps to appreciate that beyond certain levels, organic farms do not always make profits. In this case, organic farmers can achieve their pro-social and pro-environmental goals through government support systems. Otherwise, organic farmers could embrace contemporary farming or reduce their farm sizes considerably, impacting the health of Canadians adversely. Organic farms in Ontario could take advantage of their economies of scale, but the process of such exploitation could result in diseconomies of scale. Given that a substantial number of Canadian organic farmers do not engage in the practice because of its profitability, government support

could encourage them to boost their productivity despite the challenges they encounter. As such, the government should support organic farmers beyond the currently offered aid.

7.5 Research Objective 4: Challenges Facing Organic Farming in Ontario

7.5.1 Summary of the Findings

The study included an analysis of the challenges facing small and medium-sized organic farms in Ontario. The thesis established that the majority of organic farms sold their products within the province and neighboring regions. This issue might not affect the farmers' mindset significantly given their amount of products; nevertheless, the low market share could inhibit increased production opportunities and expansion to the national market. Accordingly, the farms could face difficulties growing their profits through efficient production because of the relatively low market share. The thesis further established that most of the farms analyzed were unsuccessful as perceived by the respondents and demonstrated by the quantitative data analysis. Although this may not suggest that most organic farmers are likely to abandon the practice soon, some might refrain from organic farming in favor of conventional agribusiness. Alternatively, some farmers might opt to reduce the sizes of their farms to minimize losses. Doing so would reduce the supply of organic farm products in Ontario and impact the health of Canadians negatively.

7.5.2 Conclusion

The thesis concluded that other than the profitability challenge, organic farms in Ontario experience other non-financial problems. Although the challenges are non-financial, they influence farm performance negatively hence undermine their overall profitability. Even though the government supports organic farmers through research and development and agricultural

colleges, the majority of farms do not receive such aid. In this case, the government should ensure that the farms receive the support offered by making regular and thorough follow-ups to determine the farms that do not receive assistance. Additionally, the government should device other forms of support to address the various challenges that farms encounter. Doing so would be critical in reducing the number of farms that record losses continuously.

7.6 Recommendations

The first research objective showed that profitability impacted both small and medium-sized organic farms in Ontario negatively, indicating that the medium-sized farms could not capitalize on economies of scale to boost their profitability. Also, the thesis established that majority of the small and medium-sized farms in Ontario sold their products to people living in neighboring regions. While this approach garnered sales, the farmers could not increase profits because the market was relatively small. Furthermore, the thesis established that despite the government supporting the farms through research and development, funds allocation, and organic farming courses in colleges, most of the farms analyzed did not receive direct aid. The researcher recommends three solutions to increasing the profits made by organic farmers and ensuring the continuity of organic farming.

1. Since most farms analyzed claimed to lack direct government support, the state should ensure that the extension services offered reach all organic farmers in the province. The government could conduct field surveys regularly to determine the number of farms that receive extension services annually. If the number of farms receiving support each year does not improve, the government should develop various strategies to reach more farmers. Additionally, the government should keep records of the number of farms visited by

extension service officers annually and the kinds of services offered. Doing so would provide an overview of the effectiveness of extension services to improve it. Otherwise, the farmers' complaints and challenges might escalate despite the government's effort to support organic farmers.

2. Secondly, the government should consider developing other support programs, in particular, financial aid. For instance, the government should consider introducing financial institutions that serve organic farmers solely and directly. The financial institutions could offer loans to farmers at relatively low interests and favorable terms, thus sustaining organic farming, especially business ventures. Doing so would be vital for new farmers that join the practice due to its profitability. Also, the approach would be critical to other farmers because they would be encouraged to expand their farming practices despite the profitability challenge.
3. Lastly, the government should consider developing local and international markets for organic products to encourage farmers to boost their productivity with the assurance of making sales. A more in-depth analysis of this issue showed that the majority of small and medium-sized farmers sell their products in Ontario and to neighboring regions. Although the market is sufficient for most of them, given the size of their farm products, economically, they might not sell their products at competitive prices like their counterparts from other nations. Specifically, Canada imports most of its organic products from other countries. In this case, the government should consider supporting organic farming financially and developing international markets for organic farmers regardless of their farm sizes.

7.7 Thesis' Contribution

The thesis applied a multi-disciplinary approach to evaluate whether organic farming in Ontario was challenged by profitability. It established that organic farm products are critical at enhancing the health of Canadians. Additionally, organic farming played vital roles in protecting the environment by reducing soil erosion and water pollution, among other benefits, thus critical to national development. More so, the profitability of organic farming was crucial to the success of farmers and the attainment of pro-social and pro-environment goals. The findings agreed with previous studies on the topic, with the thesis embracing different perspectives to provide an in-depth overview of the critical role of profits in organic farming towards achieving pro-social and pro-environmental goals. Accordingly, the study provides researchers with an overview of the profitability of organic agriculture in Ontario to inform future studies. In addition, the thesis offers policymakers with vital information applicable in the formulation of regulation towards boosting organic farming in Canada. Also, the recommendations summarize the needs of small and medium-sized organic farms in the attainment of set goals.

Further, the thesis recommended three steps through which the Canadian government could support organic farming in Ontario. The study established that the government should ensure that the assistance it offers to organic farmers reaches each farm and develops financial instruments to support the farmers financially. Additionally, the study recommended that the government should develop markets for organic farm products to allow farmers to trade their products at competitive prices. As a result, the research contributes to the existing body of literature by outlining some of the measures that could enhance organic farming in Ontario. Specifically, policymakers at the provincial and national level can use the thesis' findings and recommendations to improve the performance of organic agriculture in Ontario and Canada.

7.8 Summary

Chapter seven finalizes the thesis by summarizing the findings, depicting the extent to which research objectives were attained, then providing a conclusion after each summary finding. Most of the farms claimed; that there is a lack of direct government support, so the provincial and federal governments should ensure that the extension services offered reach all organic farmers in the province. The government should also consider developing other support programs, particularly financial aid. The government should also consider developing local and international markets for organic products to encourage farmers to boost their productivity with the assurance of making sales, since the majority of the organic farms are selling their product to immediate areas within the province. In the end, such findings would be useful for farmers considering organic food growth, policymakers trying to determine whether organic farmers require subsidies, and scholars who would like to know more about the profit structure of organic farms.

References

Aertsens, J., Verbeke, W., Mondelaers, K., & van Huylenbroeck, G.(2009). Personal determinants of organic food consumption: A review. *British Food Journal, 111*(10), 1140-1167.

Agriculture and Agri-Food Canada (AAFC, 2012). Certified Organic Farms in Canada 1992 – 2009. Retrieved from:

https://inspection.canada.ca/about-cfia/transparency/corporate-management-reporting/audits-reviews-and-evaluations/fertilizer-program/report/eng/1381152911549/1381153355767

Agriculture Canada. (2009). Research in Sustainable Agriculture. *Proceedings of a workshop 3-4* February, 2009 (7): Saint-Hyacinthe, QC.

Aguilar, A. G., Ward, P. M., & Smith Sr, C. B. (2003). Globalization, Regional Development, and Mega-City Expansion in Latin America: Analyzing Mexico City's Peri-urban Hinterland. Cities, 20(1): 3-21.

Retrieved from: http://www.sciencedirect.com/science/article/pii/S0264275102000926

Alan, D., et. al. (2009). Nutritional Quality of Organic foods: A Systematic Review, *The American Journal of Clinical Nutrition.*

Retrieved from http://ajcn.nutrition.org/content/90/3/680.full

Albert. H., (2011). *The Soil and Health: A Study of Organic Agriculture*. Lexington: University Press of Kentucky.

Retrieved from:

https://books.google.co.ke/books?hl=en&lr=&id=bBjnBaJLoZgC&oi=fnd&pg=PR11&dq=The+Soil+and+Health+A+Study+of+Organic+Agriculture.&ots=iiK3CLr67T&sig=Gh8DyDWmrc0aFs2KADrskzHUJGg&redir_esc=y#v=onepage&q=The%

20Soil%20and%20Health%20A%20Study%20of%20Organic%20Agriculture.&f=false

Anaphylaxis, campaign. (2015).

Retrieved from: http://www.anaphylaxis.org.uk/wp-content/uploads/2015/06/Peanut-v7-formatted-with-new-logo.pdf

Anonymous. (2012). International Plant Protection Convention.

Retrieved from:

www.ippc.int/file_uploaded/1253520711289_26th_APPPC_Summary_report

&

https://www.ippc.int/static/media/files/publications/en/2013/06/06/1329129099_ippc_2011 -12-01_reformatted.pdf

Bachmann, F., (2011). Potential and Limitations of Organic and Fair Trade Cotton for Improving Livelihoods of Smallholders: Evidence from Central Asia. *Renewable Agriculture and Food Systems*, 27(2), 138-147, First View Article: 1-10.

Badgely, C., et.al (2006). Organic Agriculture and the Global Food Supply. *Renewable Agriculture and Food Systems*, 22(2); 88-108.

Badgley, C.,& Perfecto, I., (2007). Can Organic Agriculture Feed the World? *Renewable Agriculture and Food Systems* 22(2): 80-86

Bakewell-Stone, P., et al. (2008).Potentials for organic agriculture to sustain livelihoods in Tanzania. *International Journal of Agricultural Sustainability* 6(1): 22-36.

Baranski, M., et al (2014), Higher Antioxidant and Lower Cadmium Concentrations and Lower Incidence of Pesticide Residues in Organically Grown Crops: A Systematic Literature Review and Meta-Analyses. British Journal of Nutrition, 112(5):794-811.

Bello, W.B. (2008). *Problems and prospects of organic farming in developing countries*.1 (1) 5.http://www.ajol.info/index.php/ejesm/article/viewFile/41568/8868

Benbrook, C., Zhao, X., Yanez, J., Davies, N., &Andrews, P. (2008). New evidence confirms the nutritional superiority of plant-based organic foods. *The Organic Center*. https://organic-center.org/reportfiles/Nutrient_Content_SSR_Executive_Summary_FINAL.pdf

Bird, D. (2009). The use of questionnaires for acquiring information on publicperception of natural hazards and risk mitigation –a review of current knowledge and practice. Nat. *Hazards Earth Syst. Sci.,* 9, 1307–1325.

Blench, R., 2015. *Genetically Modified Organisms and their Critics.* Retrieved from: http://rogerblench.info/Biodiversity/GMOs.pdf

Brandt, K., C. Leifert, R. Sanderson, and C.J. Seal. 2011. Agro - ecosystem Management and Nutritional Quality of Plant Foods: The Case of Organic Fruits and Vegetables. *Critical Reviews in Plant Sciences* 30 (1-2): 177–97.

Brian K., (2015). *Organic Struggle: The Movement for Sustainable Agriculture in the United States*. USA: Obach MIT Press.

Retrieved from: http://sf.oxfordjournals.org/content/early/2016/03/08/sf.sow016.extract

Brenner. First Initial? (2016). *Dollars and Sense: The Economic Benefits of Reducing Pesticide Use.*

Retrieved from: http://eap.mcgill.ca/MagRack/JPR/JPR_12.htm

Bruch, M., & Ernst, M., (2010). *A Farmer's Guide to Marketing through Community Supported Agriculture (CSAs)* University of Tennessee. Institute of Agriculture.
Retrieved from: https://utextension.tennessee.edu/publications/documents/pb1797.pdf

Bureau of Labor Statistics, U.S Department of Labor. (2015). *Employment and Unemployment among Youth.*
Retrieved from: http://www.bls.gov/news.release/pdf/youth.pdf

Canadian Organic Growers. (2010). *A Study of Potential Market Niches for Canadian Organic Producers*. Report to the International Programs Branch, Agriculture Canada. Canadian Organic Growers, Ottawa (unpubl.), 92 pp.

Canada Organic Trade Association, (2013). *The BC Organic Market, Growth, Trends and Opportunities.*
Retrieved from:
http://www.certifiedorganic.bc.ca/docs/BC%20Organic%20Market%20Report%202013.pdf

Canadian International Development Agency –CIDA. (2006). *Sustainable Development Strategy* 2007-2009, Canadian International Development Agency (CIDA)

Carolyn, D., & Lydiah O., (2009). *Marketing U.S Organic Foods. Recent trends from Farms to Consumers*.
Retrieved from: http://www.ers.usda.gov/media/185272/eib58_1_.pdf

Chang, H. S., & Zepeda, L., (2005). Consumer Perceptions and Demand for Organic Food in Australia: Focus Group Discussions. *Renewable Agriculture and Food Systems,* 20(03): 155-163

Clough, Y., et al. (2011). *Combining High Biodiversity with High Yields in Tropical Agro-Forests.* Proceedings of the National Academy of Sciences 108(20): 8311- 8316.

Cook M.S., Khan, R.Z., & Pickett, A.J., (2007). *The Use of Push-Pull Strategies in Integrated Pest Management*. Annual Review of Entomology. Vol. 52: 375-400. Retrieved from: http://entomology.ifas.ufl.edu/capinera/eny5236/pest2/content/14/29_push_pull_strategy.pdf

COTA (2014). An Information Feature for Canada Organic Trade Association: Celebrating Organic. Retrieved from: https://ota.com/sites/default/files/indexed_files/COTA_GlobeAndMail_2014.pdf

Creswell, J., & Creswell, D. (2018).*Research design: Qualitative, quantitative, and mixed method approaches*. London: Sage.

Dangour, A. D., et al. (2009). Nutritional Quality of Organic Foods: A Systematic Review. *The American Journal of Clinical Nutrition*, 90(3), 680-685.

Darnhofer, I., Schneeberger, W., &Freyer, B. (2005). Converting or not converting to organic farming in Austria: Farmer types and their rationale. *Agriculture and Human Values.* 22(1), 39-52.

DEFRA. (2002*). Implications of Changes in the Structure of Agricultural Businesses*, DEFRA Retrieved from: http://statistics.defra.gov.uk/esg/reports/icsab/defaul

De Ponti, T., Rijk, M.K., & Van I., (2012). The Crop Yield Gap between Organic and Conventional Agriculture. *Agricultural Systems* 108: 1–9.

Diebel, P.L., Williams, J.R., & Llewelyn, R.V., (2005). An Economic Comparison of Conventional and Alternative Cropping Systems for a Representative Northeast Kansas Farm. *Review of Agricultural Economics*. 17 (3).

Dobbs, T. L., & Pretty, J. N., (2004). Agri-environmental stewardship schemes and Multifunctionality. *Applied Economic Perspectives and Policy,* 26(2): 220-237.

Dobbs, T., (2012). Price Premiums for Organic Crops. *CHOICES*, Second Farm. *Review of Agricultural Economics* 17(3):323-335.

Edge. J., (2013). *Cultivating Opportunities, Canada's Grown Appetite for Local Food*. The Conference Board of Canada.

Escobar, M.E., & Hue, N.V, (2007). Current Developments in Organic Farming. India: Research Signpost.

Fairweather, J.R., & Campbell, H. (1996).The decision making of organic and conventional agricultural producers (AERU Research Report No. 233). Lincoln University, New Zealand.Framework.http://link.springer.com/article/10.1177/009207002236907#page-1

Fairweather, J. R. (1999). Understanding how farmers choose between organic and conventional production: Results from New Zealand and policy implications. *Agriculture and Human Values*, 16(1), 51-63.

Forge. F (2004). *Organic Farming in Canada.* Retrieved from: http://www.lop.parl.gc.ca/content/lop/researchpublications/prb0029-e.htm#TOPGattinger, A. et al. (2012). Enhanced top soil carbon stocks under organic farming. *Proceedings of the National Academy of Sciences*, 109(44), 18226-18231.

Gattinger, A., et.al (2012). Enhanced Top Soil Carbon Stocks under Organic Farming. Proceedings of the National Academy of Sciences, 109(44), 18226-18231.

Groh, T., & McFadden, S., (1998). *Farms of Tomorrow Revisited Community-Supported Farms Farm-Supported Communities.* Steiner Books.

Retrieve from: https://www.amazon.com/Farms-Tomorrow-Revisited-Community-Supported-Farms_Farm-Supported/dp/0938250132

Guthman, J. (2014). Agrarian dreams: The paradox of organic farming in California. Los Angeles: Univ of California Press.

Hegeman, R., (2002). "Organic Farming Growing Market for Traditionally. Retrieved from: http://www.nwkansas.com/gldwebpages/pdf%20pages-all/gdn%20pages:pdfs%202002/gdn%20pages:03%20Mar/Week%202/%20Thursday/gld%20legals%20(12-14)%2003-07.pdf

Helga, W. & Minou, Y. (eds.). The World of Organic Agriculture. Statistics and Emerging Trends 2007 (Bonn, Germany, and Frick, Switzerland: International Federation of Organic Agriculture Movements and Research Institute of Organic Agriculture, 2007), p. 205.

Hill, S. B., & MacRae, R. J., (1992). Organic Farming in Canada. Agriculture, Ecosystems & Environment, Journal? 3 9(1-2), 71-84.

Hill, S.B. (2005). Redesigning the Food System for Sustainability. *Alternatives* 12(3/4):32-36.

Hill, H., & MacRae, R.J., (2012) *Organic Farming in Canada*. Department of Entomology; MacDonald College McGill University.

Holden. P., (2004). Organic M.C. Farming, Food Quality, and Human Health. Retrieved from: http://www.soilassociation.org/LinkClick.aspx?fileticket=cY8kfP3Q%2BgA%3D

Hole, D. G., et. al., (2005). Does Organic Farming Benefit Biodiversity? *Biological Conservation* 122(1): 113-130.

Holz-Clause. M., (2009). *Understanding Community Supported Agriculture.* Iowa State University.

Retrieved from: http://www.agmrc.org/business-development/operating-a-business/direct-marketing/articles/understanding-community-supported-agriculture/

Hughner, R. S., et al. (2007). Who are Organic Food Consumers? A Compilation and Review of Why People Purchase Organic food. *Journal of Consumer Behavior*, 6(2-3), 94-110.

ICM. (2011). Agricultural Extension Component (AEC) - Agricultural Sector Program Support (Phase 2).

IFOAM. (2012). *Participatory Guarantee Systems for Organic Agriculture.* Retrieved from: http://www.centroecologico.org.br/certificacao_download.php?id_pdfcertificacao=30&tipo=pdf & http://www.ifoam.org/about_ifoam/standards/pgs.html

International Federation of Organic Agriculture Movement -IFOAM (2013).

Retrieved from: http://www.ifoam.org/about_ifoam/standards/pgs.html

International Fund for Agricultural Development-*IFAD 2005 Report*. (2005). Retrieved from: https://www.ifad.org/documents/10180/3e9c6239-449e-4dba-951a-849e301616d5

Jeyaratnam, J., (2007). Acute Pesticide Poisoning: A Major Global Health Problem. *World Health Stat Quarterly* 43(5): 139-144.

Retrieved from:

http://apps.who.int/iris/bitstream/10665/51746/1/WHSQ_1990_43_n3_p139-144_eng.pdf

Jones, R., (2010). Green Harvest: A History of Organic Farming and Gardening in Australia. Collingwood, Vic: CSIRO Pub.

Retrieved from:

http://www.limina.arts.uwa.edu.au/__data/assets/pdf_file/0008/2571056/Jones-Review.pdf

Jordan, C.F., (2002). Genetic Engineering, The Farm Crisis, and World Hunger. *Bioscience* 52:73-79. Retrieved from: http://bioscience.oxfordjournals.org/content/52/6/523.full

Juan J, (2012). *Organic Agriculture and the Millennium Development Goals*. IFOAM Dossier: Germany. Retrieved from: http://www.feder.bio/files/1529.pdf

Kendal, P., (2014). *Backing the Business of British Farming*: NFU Conference. Retrieved from: https://www.nfuonline.com/assets/30160

Kinsella, J., Wilson, S., De Jong, F., & Renting, H. (2000). Pluriactivity as a Livelihood strategy in Irish Farm Households and its Role in Rural Development. *Sociologia Ruralis,* 40(4), 481-496.

Retrieved from: http://onlinelibrary.wiley.com/doi/10.1111/1467-9523.00162/abstract

Knutson, RD., et al. (2012). *Economic Impacts of Reduced Chemical Use*. College Station, TX: Knutson and Associates.

Retrieve from: https://www.afpc.tamu.edu/pubs/1/148/99-2.pdf

Koenig, L.R., & Baker, B., (2016). U*.S. National Organic Program Standards: Implications for Researchers.* The American Phytopathological Society.

Retrieved from: http://www.apsnet.org/publications/apsnetfeatures/Pages/Organics.aspx

Krystallis, A., & Chryssohoidis, G., (2005). Consumers' Willingness to Pay for Organic Food: Factors that Affect it and Variation per Organic Product Type. *British Food Journal*, 107(5), 320-343. Retrieved from: http://www.emeraldinsight.com/doi/pdfplus/10.1108/00070700510596901

Kuepper.G. (2010). History and Philosophy of Organic Agriculture. Kerr Center for Sustainable Agriculture.
Retrieved from: http://kerrcenter.com/wp-content/uploads/2014/08/organic-philosophy-report.pdf

Karakowsky, L., Carroll, A., &Buchholtz, A. (2008).*The responsibilities of business: Managing stakeholders and Ethics.* Toronto, Canada: Thomson Nelson.

Kendal, P. (2014). *Backing the business of British farming*: NFU Conference.https://www.nfuonline.com/assets/30160

Lairon, D., (2009). Nutritional Quality and Safety of Organic Food. A Review of Agronomic Sustainable Development. Retrieved from: http://link.springer.com/article/10.1051/agro/2009019#/page-1

Lamers, M., Anyusheva, M., La, N., Nguyen, V., & Streck, T. (2011). *Pesticide pollution in surface and ground water.* Institute of Soil Science and Land Evaluation. Stuttgart; Germany.

Leifeld, J., & Fuhrer, J. (2010). Organic farming and soil carbon sequestration: What do we really know about the benefits? *AMBIO: A Journal of the Human Environment* 1-15*,* 39 (8): 585-599.

Lu, C., Toepel, K., & Irish R., 2006. Organic Diets Significantly Lower Children's Dietary Exposure to Organo-Phosphorus Pesticides. Environ Health Perspective, 114(12): 260-263.

MacRae, R.J., & Hill, S.B. (1990). *Literature Review: Studies on the Marketing of Organic Produce in North America and Europe.* Report to the International Programs Branch, Agriculture Canada. Canadian Organic Growers, Ottawa.

Macey, A., (2013) Certified Organic Production in Canada. Chapel Street, Ottawa.

Makoni, N., and Katerere, J., (2010). Genetically Modified Crops. Retrieved from: http://www.unep.org/DEWA/Africa/docs/en/aeo-2/chapters/aeo-2_ch09_GENETICALLY_MODIFIED_CROPS.pdf

McHughen, A., (2000). *Pandora's Picnic Basket: The Potential and Hazards of Genetically Modified Foods*. The Potential and Hazards of Genetically Modified Foods. Oxford University Press, UK.

Mendenhall, W., Reinmuth, J., Beaver, R., (2002). Statistics for Management and Economics (International Dimensions of Business Series). USA: South-Western College Publishers.

Michael Hart (2001). Chair of the Small and Family Farms Alliance speaking at the 'On Fertile Ground' Gathering. UK: Oxford University Press.

Midmore, M. & Lampkin, M., (2004). Modeling, the Impact of Widespread Conversion to Organic Farming: An Overview. In *The Economics of Organic Farming: An International Perspective.* N. Lampkin and S. Padel (eds). Wallingford, CAB International: 371-380.

Milestad, R., & Darnhofer, I. (2003).Building farm resilience: The prospects and challenges of organic farming. *Journal of Sustainable Agriculture, 22*(3), 81-97.

Minnesota State University. (2016). *Supply and Demand: The Market Mechanism.* Retrieved from: http://kr.mnsu.edu/~cu7296vs/supdem.htm

Morgera, E., Bullon, C., & Marin, G., (2012). *Organic Agriculture and Law. Knowledge Exchange, Research and Extension*. Italy: Development Law Service.

Nandwani, D., (2016). *Organic Farming for Sustainable Agriculture*. Nepal: Rural Sociology Institute of Agriculture and Animal Science. Retrieve from:

http://download.springer.com/static/pdf/583/bfm%253A978-3-319-26803-3%252F1.pdf?originUrl=http%3A%2F%2Flink.springer.com%2Fbook%2Fbfm%3A978-3-319-26803-3%2F1&token2=exp=1471353629~acl=%2Fstatic%2Fpdf%2F583%2Fbfm%25253A978-3-319-26803-3%25252F1.pdf%3ForiginUrl%3Dhttp%253A%252F%252Flink.springer.com%252Fbook%252Fbfm%253A978-3-319-26803-3%252F1*~hmac=eb7d0c8e5710ddea81266f194687737cf114b2c5fe07b44917ece623267ce830

National Farmers Union Canada. (2003). *The Farm Crisis and Corporate Profits.* Retrieved from:http://www.nfu.ca/sites/www.nfu.ca/files/corporate_profits.pdf

Navazio, J., (2012). *The Organic Seed Grower: A Farmer's Guide to Vegetable Seed Production*. White River Junction, Vt: Chelsea Green Publishers

Newton, J., (2007). *Profitable Organic Farming*. Oxford: John Wiley & Sons.

Northbourne, L., (1940). *Look to the Land*, London: Angelico Press. Retrieved from: https://books.google.co.ke/books?id=aHl0JooC9K4C&printsec=frontcover&source=gbs_ge_summary_r&cad=0#v=onepage&q&f=false

Olesen, J. E., et.al (2011). Impacts and Adaptation of European Crop Production Systems to Climate Change. *European Journal of Agronomy*, 34(2), 96-112. Retrieved from: http://www.sciencedirect.com/science/article/pii/S1161030110001061

Ontario CSA Directory. (2014). *CSA: Ontario directory*. http://csafarms.ca/CSA%20farmers.htm

Organic Council of Ontario. (n.d).

http://www.cluteinstitute.com/ojs/index.php/JBER/article/download/2532/2578

Organic Council of Ontario. (2013).

http://www.organiccouncil.ca/wordpress/wpcontent/uploads/2012/08/organic_production_in_ontario.pdf.

Organic Farming Research Foundation. (2012). *Organic Farming for Health and Prosperity.*

Retrieved from: http://ofrf.org/sites/ofrf.org/files/docs/pdf/HP-report-web.pdf

Organization for Economic Co-operation and Development. (2003). *Annual Report*.

http://www.oecd.org/about/2506789.pdf

Packaged Facts. (2013). *Organic Foods Market - US Report.*

Retrieved from: http://www.MarketResearch.com

Padel, S. (2001). Conversion to organic farming: A typical example of the diffusion of an innovation? Sociologiaruralis, 41(1), 40-61.

Padel, S., & Lampkin, N. H. (2015).Farm-level performance of organic farming systems: An Overview. In: *The Economics of Organic Farming*. (eds. N. H. Lampkin and S. Padel). CAB International; Wallingford, pp. 210-219.

Parrott, N., et al. (2006). Certified and Non-Certified Organic Farming in the Developing World. *Global Development of Organic Agriculture: Challenges and Prospects.* Wallingford, Oxfordshire, U.K., CAB International: 153-179.

Retrieve from: http://www.cabi.org/cabebooks/ebook/20063090468

Perfecto, I., & Badgley, C., (2007). Can Organic Agriculture Feed the World? *Pesticide News.* p 78.

Peterson, C., (2001). The Natural. Oregon's Agricultural Progress. Journal? (Fall/Winter): 27-30.

Pilat, D., (2013). Competition, Productivity and Efficiency.
Retrieved from: http://www.oecd.org/eco/reform/17985473.pdf

Pimentel, D. (1993). Economics and energetics of organic and conventional farming. *Journal of Agricultural and Environmental Ethics*, *6*(1), 53-60.

Pimentel, D., Lach, L., Zuniga, R., & Morrison, D. (1999). Environmental and economic costs associated with non-indigenous species in the United States. New York: Cornell University.

Pimentel, D., Lach, L., Zuniga, R. & Morrison, D. (2011). Environmental and economic impacts of reducing U.S. agricultural pesticide use. In Pimentel, D. and A.A. Hanson (eds.) CRC handbook of pest management in agriculture, 2 (1). Boca Raton, PL CRC Press, Inc.

Prokopy, RJ. et. al. (2000). Transitional Steps toward Second Stage Integrated Management of Arthropod Pests of Apple in Massachusetts Orchards. I. *Econ. Entomol.* 83(6):2405-2410.

Rana, S. (2013). Quality: Organic Vs. Conventional Food.
Retrieved from: http://orgprints.org/19504/1/Report_2011_(1).pdf

Reganold, P., & Wachter, M., (2016). Organic Agriculture in the 21st Century. *Nature Plants*, Vol 2 (10):1-10

Research Institution FIBL. (2015). Sustainability and Quality of Organic Food.
Retrieved from: https://shop.fibl.org/fileadmin/documents/shop/1413-organic-products.pdf

Rigby, D., & Caceres, D. (2001).Organic farming and the sustainability of agricultural systems. *Agricultural Systems*, 68: 21-40.

Rotz, C. A., (2004). Management to Reduce Nitrogen Losses in Animal Production. *Journal of Animal Science,* 82(13_suppl), E119-E137.

Salkind, N. (2010). *Encyclopedia of research design*. London: Sage publications, Inc.

Schumilas, T., (2012). Organic Production in Ontario. Retrieved from: http://www.organiccouncil.ca/wordpress/wpcontent/uploads/2012/08/organic_production_in_ontario.pdf

Scialabba, N., &Hattam, C. Eds. (2002).Organic agriculture, environment, and food security. *Environment and Natural Resources Series (No. 4).* Italy: Natural Resources Management and Environment Department, Food and Agriculture Organization of the United Nations (FAO).

Science Council of Canada. (2006). A Growing Concern: Soil Degradation in Canada. 24 pp. Ottawa: Science Council of Canada.

Seccombe, W. (2007). A Home-Grown Strategy for Ontario Agriculture: A new deal for farmers, A new relationship with consumers. Toronto: Toronto Food Policy Council.

Secretariat of the Pacific Community. (2009*). Benefits of Organic Farming*. Retrieved from: file:///C:/Users/HP03/Downloads/pafpnet_policy%20brief8_web.pdf

Seufert, V. (2012).Organic agriculture as an opportunity for sustainable agricultural development.https://www.mcgill.ca/isid/files/isid/seufert.pb13.pdf

Seufert, V Foley, A., & Ramankutty, N., (2012). Comparing the Yields of Organic Conventional Agriculture." Nature 485: 229–32.

Shepherd, M., et al. (2013). An assessment of the environmental Impacts of Organic Farming. Retrieved from: http://orgprints.org/6784/2/OF0405_909_TRP.pdf

Smith-Spangler, C., et. al. (2012). Are Organic Foods Safer or Healthier than Conventional Alternatives? A Systematic Review. *"Annals of Internal Medicine* 157 (5): 348–66.

Sovacool, B.K., & Brown, M.A., (2010). Twelve Metropolitan Carbon Footprints: A Preliminary Global Comparative Assessment. *Energy Policy*. 38 (9). pp. 4856–486.

Stolze M., Piorr A., Härring A., & Dabbert S., (2000). The Environmental Impacts of Organic Farming in Europe. *Organic Farming in Europe: Economics and Policy, Volume* 6. 143 pp. 1-126.

Retrieved from: https://www.uni-hohenheim.de/i410a/ofeurope/organicfarmingineurope-vol6.pdf

Stolze, M., & Lampkin, N., (2009). Policy for Organic Farming: Rationale and Concepts. Food Policy. 34(1): 237-244.

Retrieve from: http://www.sciencedirect.com/science/article/pii/S0306919209000323

Strassner, C., & Cavoski, I., (2015). How the Organic Food Systems Support Sustainable Diets and Translate These into Practice: *The Frontiers in Nutrition Journal*, 2(19): 1-6, India

Strauss, M. (2015). Green shoppers are a force to reckon with. *Globe and Mail*. 12 April. http://www.theglobeandmail.com/report-on-business/rob-commentary/canadas-diverse-work-force-gave-my-startup-an-unfair-edge/article25646976/

Sundrum, A., (2001). Organic Livestock Farming: A Critical Review. *Livestock Production Science* 67 (3): 207–15.

Sweet, J., & Eastham, K., (2002). *Genetically Modified Organisms: The Significance of Gene Flow through Pollen Transfer.*

Retrieved from: http://www.pedz.uni-mannheim.de/daten/edz-bn/eua/02/28.pdf

The Conference Board of Canada (2008). How Canada Performs: Organic Farming. Retrieved from: http://ideas.typepad.com/poverty/CanadaRpt.pdf & http://www.conferenceboard.ca/hcp/details/environment/area-under-organic-farming.aspx

The Millennium Ecosystem Assessment. (2004). *A Toolkit for Understanding and Action. Protecting natures Services. Protecting Ourselves*. Retrieved from: https://www.unpei.org/sites/default/files/PDF/ecosystems-economicanalysis/MEA-A-Toolkit.pdf

The Millennium Ecosystem Assessment. (2014). Retrieved from: http://www.millenniumassessment.org/documents/document.766.aspx.pdf & http://www.millenniumassessment.org/en/index.html

Thomas, V.G., & Kenan. G., (2003). Basic Principles of Agro-ecology and Sustainable Agriculture. Retrieved from: https://www.researchgate.net/publication/226285349_Basic_principles_of_agroecology_and_sustainable_agriculture & http://link.springer.com/article/10.1007/BF01965612#page-1

Tuck, S. L., et. al (2014). Land-Use Intensity and the Effects of Organic Farming on Biodiversity: A Hierarchical Meta-Analysis. *Journal of Applied Ecology,* 51(3), 746-755.

United States Department of Agriculture. (2014). *Economic Research Service, Organic Market Overview.*

Retrieved from: http://www.ers.usda.gov/topics/natural-resources-environment/organic-agriculture/organic-market-overview.aspx

USDA. (2014). Everything You Need to Know About Organic Foods.

Retrieved from: http://www.whfoods.com/genpage.php?tname=faq&dbid=17

USDA. (2016*). Organic Market Overview*. (Figure II).

Retrieved from: http://www.ers.usda.gov/topics/natural-resources-environment/organic-agriculture/organic-market-overview.aspx

University of California Library, (2016). *Cultivating a Movement, An Oral History Series on Organic Farming and Sustainable Agriculture on California's Central Coast.*

Retrieved from: https://library.ucsc.edu/reg-hist/cultiv/timeline

Uzogara, S., (2010). The Impact of Genetic Modification of Human Foods in the 21st Century. Biotechnology Advances, 18 (3), 179–206.

Vicini J., (2008). Survey of Retail Milk Composition as Affected by Label Claims Regarding Farm Management Practices. *Journal of the American Dietetic Association.*; 108:1198-1203.

Water Science and Technology Directorate Environment Canada (2011). Presence of Levels of Priority Pesticides in Selected Canadian Aquatic Ecosystems.

Retrieved from: http://www.ec.gc.ca/Publications/FAFE8474-C360-46CC-81AB-30565982E897/PresenceAndLevelsOfPriorityPesticidesInSelectedCanadianAquaticEcosystems.pdf

Wang, X., and Zhou, Y., (2014), *Structural Imbalance, Inequality and Economic Growth.*

Retrieved from: http://press.anu.edu.au/wp-content/uploads/2014/07/3.-Structural-Imbalance-Inequality-and-Economic-Growth-Xiaolu-Wang-and-Yixiao-Zhou.pdf

William, L. (2007). Organic farming: An international history. Wallingford, U.K.: CABI, Zilberman. London, U.K.: CAB International.

World Bank Report on Organic Farming. (2015). Retrieved from: https://www.imf.org/external/pubs/ft/sdn/2015/sdn1513.pdf

Wynen, E. (2008).The world of organic agriculture statistics and emerging trends 2008, main results. In: *IFOAM/FiBL 2008: The World of Organic Agriculture*: Bonn/Frick 2008. http://orgprints.org/10506

Yadav, M., &Varadarajan, R. (2012). Marketing strategy and the internet: An organizing framework. http://link.springer.com/article/10.1177/009207002236907#page-1

Zinati, G. M. (2002). Transition from conventional to organic farming systems: *I. Challenges, Recommendations, and Guidelines for Pest Management*. Hort Technology 12:606-610.

APPENDICES

Questionnaire
Section A

Farm Information

1. Name of the farm _____

2. Kindly indicate the name of the person who owns the farm _____

3. Kindly indicate the gender of the farm owner

- ☐ Male
- ☐ Female

4. What is your age?

- ☐ 20 – 29
- ☐ 30 – 39
- ☐ 40 – 49
- ☐ 50 – 59
- ☐ 60 – 69
- ☐ 70 +

5. What is the legal status of your farm? (Check the appropriate box)

- ☐ Sole proprietorship
- ☐ Partnership
- ☐ Family corporation
- ☐ Non-family corporation (including corporations with one shareholder)

6. Please identify your business type:

- ☐ Agricultural producer

- ☐ Food processor
- ☐ Trading house
- ☐ Contract manufacturer
- ☐ Others (Specify) _____

7. Please enter the farm's main location

_____ _____ _____

Number Road/street Name of village, town, city or municipality

8. What is the status of organic products? (Check the appropriate box)

- ☐ Certified by an organic certifying body
- ☐ Transitional (in the process of becoming certified)

9. How many employees/labourers do you have? (Check the appropriate box).

Full time

- ☐ 1 – 10
- ☐ 11 – 50
- ☐ 51 – 100
- ☐ 101 – 200
- ☐ More than 200

Part-time

- ☐ 1 – 10
- ☐ 11 – 50
- ☐ 51 – 100
- ☐ 101 – 200
- ☐ More than 200

Section B

General Information

1. What unit of measure will be used to report land areas? (Check the appropriate box).

- ☐ Acres
- ☐ Hectares

1 acre = 0.40 hectare

1 hectare = 2.47 acres

2. How much was the total land area in organic operation for the last three years (2015 – 2017)?

Year	Land area
2015	……..
2016	……..
2017	……..

3. What is the size of your organic farm? (Check the appropriate box).

- ☐ Small
- ☐ Medium
- ☐ Large

4. Why do you farm organic? Explain the main reasons

5. What kind of support can a farmer already in the business of organic farming expect?

6. Should governments get involved in subsidizing farmers, promoting local food economies, and growing sound agricultural practices? If yes, please explain how

Section C

Financial Information

1. What was the total gross revenue (sales) per year for the last three years (2015 – 2017)?

2015 (C$)	2016 (C$)	2017 (C$)
Under $15,000 ○	Under $15,000 ○	Under $15,000 ○
$15,001 – $50,000 ○	$15,001 – $50,000 ○	$15,001 – $50,000 ○
$50,001 – $250,000 ○	$50,001 – $250,000 ○	$50,001 – $250,000 ○
$250,001 – $500,000 ○	$250,001 – $500,000 ○	$250,001 – $500,000 ○
$500,001 – $750,000 ○	$500,001 – $750,000 ○	$500,001 – $750,000 ○
$750,001 – $1,000,000 ○	$750,001 – $1,000,000 ○	$750,001 – $1,000,000 ○
$1,000,001 and over ○	$1,000,001 and over ○	$1,000,001 and over ○

2. What were the total variable costs per year for the last three years (2015 – 2017)?

2015 (C$)	2016 (C$)	2017 (C$)
Under $9,000 ○	Under $9,000 ○	Under $9,000 ○
$9,001 – $25,000 ○	$9,001 – $25,000 ○	$9,001 – $25,000 ○
$25,001 – $130,000 ○	$25,001 – $130,000 ○	$25,001 – $130,000 ○
$130,001 – $240,000 ○	$130,001 – $240,000 ○	$130,001 – $240,000 ○
$240,001 – $390,000 ○	$240,001 – $390,000 ○	$240,001 – $390,000 ○
$390,001 – $500,000 ○	$390,001 – $500,000 ○	$390,001 – $500,000 ○
$500,001 and above ○	$500,001 and above ○	$500,001 and above ○

2a) what is the percentage of your total variable costs that your farm spends on labor costs?

(Check the appropriate box).

2015	2016	2017
0% - 10%	0% - 10%	0% - 10%
11% - 20%	11% - 20%	11% - 20%
21% - 30%	21% - 30%	21% - 30%
31% - 40%	31% - 40%	31% - 40%
41% - 50%	41% - 50%	41% - 50%
51%+	51%+	51%+

4. What were the total fixed costs per year, for the last three years (2015 – 2017)?

2015 (C$)	**2016 (C$)**	**2017 (C$)**
Under $5,000 ○	Under $5,000 ○	Under $5,000 ○
$5,001 – $15,000 ○	$5,001 – $15,000 ○	$5,001 – $15,000 ○
$15,001 – $70,000 ○	$15,001 – $70,000 ○	$15,001 – $70,000 ○
$70,001 – $160,000 ○	$70,001 – $160,000 ○	$70,001 – $160,000 ○
$150,001 – $210,000 ○	$150,001 – $210,000 ○	$150,001 – $210,000 ○
$210,001 – $300,000 ○	$210,001 – $300,000 ○	$210,001 – $300,000 ○
$300,001 and over ○	$300,001 and over ○	$300,001 and over ○

5. What was the average total amount of assets directly associated with growing organic food per year for the last three years (2015 – 2017)?

2015 (C$)	2016 (C$)	2017 (C$)
Under $50,000 ○	Under $50,000 ○	Under $50,000 ○
$50,001 – $1000,000 ○	$50,001 – $400,000 ○	$50,001 – $400,000 ○
$1,000,001 – $2,000,000 ○	$1,000,001 – $2,000,000 ○	$1,000,001 – $2,000,000 ○
$2000,001 – $4,000,000 ○	$2000,001 – $4,000,000 ○	$2000,001 – $4,000,000 ○
$4,000,001 – $6,000,000 ○	$4,000,001 – $6,000,000 ○	$4,000,001 – $6,000,000 ○
$6,000,001 – $8,000,000 ○	$6,000,001 – $8,000,000 ○	$6,000,001 – $8,000,000 ○
$8,000,001and above ○	$8,000,001and above ○	$8,000,001and above ○

5) Generally, is your annual business profitable? (Check the appropriate box).

- ☐ Profitable
- ☐ Non-profitable
- ☐ Neither profitable nor non-profitable

6) Was your farm receiving any financial support from the government programs and subsidies (National and Provincial) for the last three years (2015 – 2017)? (Check the appropriate box).

☐ Yes

☐ No

If yes, please indicate below how much

2015 …… 2016 ……. 2017 ……..

7) How would you describe your business success? (Circle the appropriate number)

1 ----------2----------3----------4----------5

Unsuccessful, Below Average, Average, Very Successful, Extremely successful

8) To what extent do the following statements describe your company? (Circle the appropriate number)

The proportion (%) of your customers that live in the immediate region is	10 20 30 40 50 60 70 80 90 100
The proportion (%) of your customers that live in your province is	10 20 30 40 50 60 70 80 90 100
The proportion (%) of your customers that live in your country is	10 20 30 40 50 60 70 80 90 100
The proportion (%) of your customers that live outside your country is	10 20 30 40 50 60 70 80 90 100

Section D

Environment and Health-Related Information

As an organic farmer in Ontario, overall do you believe organic farming will;

1) Improve the state of the environment concerning soil, water, air, and climate change, biodiversity, ecology, pollution, herbicides, and pesticides, in what way? Please explain.

2) Improve human health concerning higher-quality nutrition, avoid pesticide contamination, increase food safety, reduce the risk of disease, promote health & wellness of the society, and provide the family and children better food, in what way? Please explain.

Results' Output

Table 1: Fisher's exact test's output for 2015 farm profitability

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)
Pearson Chi-Square	2.654	2	.265	.312
Likelihood Ratio	3.131	2	.209	.312
Fisher's Exact Test	2.238			.312
N of Valid Cases	23			

Table 2: Fisher's exact test's output for 2016 farm profitability

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)
Pearson Chi-Square	2.654	2	.265	.312
Likelihood Ratio	3.131	2	.209	.312
Fisher's Exact Test	2.238			.312
N of Valid Cases	23			

Table 3: Fisher's exact test's output for 2017 farm profitability

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.289	1	.591	.657	.467
Continuity Correction	.004	1	.951		
Likelihood Ratio	.285	1	.594	.657	.467
Fisher's Exact Test				.657	.467
N of Valid Cases	23				