Buying Local:

Understanding Minnesota’s Apple Orchards and the Importance of Supporting Them

ENTS Senior Capstone Project
A paper to accompany a brochure
Winter 2009
by Allie Morgan
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It is much desired that the fruit garden shall return to men’s minds, with its personal appeal and its collections of many choice varieties, even the names of which are now unknown to the fruit-loving public . . . The commercial market ideals have come to be controlling, and most fruit-eaters have never eaten a first-class apple or pear or peach, and do not know what such fruits are . . . All this is as much to be deplored as a loss of standards of excellence in literature and music, for it is an expression of a lack of resources and a failure of sensitiveness.


Shipping is a terrible thing to do to [fruits and vegetables]. They probably get jet-lagged, just like people.

– Elizabeth Berry, American farmer and author

I. Introduction and Goals

As globalization magnifies the scope of exchange between producers and consumers, resulting in an unparalleled choice of fresh food at any time of year, a growing emphasis has been placed on understanding and supporting locally grown food. The benefits of buying from local growers are numerous, with the main drawbacks being a more restricted variety in diet and at times a higher cost. Small, local producers face a variety of challenges ranging from legislative measures to the mass production capacity of mega-growers, but more and more people are giving support to the “local movement” for its health and culinary benefits and for the human relationships that often develop as a result. To make the study of locally grown food more manageable, in this project I explore the issues surrounding one product from one region: apples grown in Minnesota.
II. Local Food – What Does it Mean, and Why Should I Care?

Over the past 40 years, the value of the international food trade has tripled and the tonnage of food shipped between nations has quadrupled, causing foods from a typical meal in the United States to travel an average of 1,500 miles from farm to table (Halweil 5) (see Appendix A). Major reasons for this upsurge in long distance food are a demographic shift toward cities, advances in transportation technology, and the availability of cheap gasoline and transportation subsidies (5). Americans (and citizens of first-world countries worldwide) now expect unparalleled dietary options; local, seasonal food has largely become an exception.

What qualifies as local food? The term lacks an agreed-upon definition; this makes it difficult to provide widely applicable guidelines for what counts as “locally grown” and what doesn’t, but also gives consumers the freedom to create and work with their own idea. Several possible definitions exist: it can be 1) from one’s nation or state; 2) from a less politically-defined boundary, such as one’s watershed; 3) from farms within a certain distance (50 miles? 150 miles? more?) from one’s house; or 4) “within a day’s leisurely drive of our homes” (58). This last description is the one I prefer, as it allows for some flexibility and communicates the idea of local farms as places we should theoretically be able to easily visit to purchase our food.

Buying locally grown products has many benefits which generally outweigh the short list of costs. The biggest argument for a globalized food system is variety, but the modern agricultural system increasingly encourages monoculture because it leads to maximum profit for minimum effort. This system is bad for the land and for local eating. Diverse crop planting, or polyculture, requires a sophisticated knowledge of the land

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1 All page references in this section are from Brian Halweil’s *Home Grown* unless otherwise noted.
which is becoming rare among the proprietors of large, mechanized farms, but which is still widely found among small-scale farmers devoted to full-time food production (29). Although economists argue that the long distance food trade is most efficient because nations (and states within those nations) can buy from the lowest-cost provider, it has been proven that importing food can cost more. Bringing in products generally includes more middle men and higher transportation costs, and it drains substantial amounts of money from the local community (6). Besides costing less and keeping more money close to home, a strong local food economy encourages crop diversity among smaller growers, involves fewer chances for contamination during transport, produces food that tends to be fresher and therefore tastes better, and fosters a connection between consumers and the growers who cultivate their food.

Where local food is purchased is also of significance, since locally grown food sold in huge grocery store chains often becomes, for all intents and purposes, non-local. Many of these chains have huge quality control centers through which all food sold in a given region must pass, so the products must first be shipped to that center, inspected, and then shipped back (7). Therefore, a piece of fruit grown five miles from one’s home could have traveled 300 miles and back before being sold in the supermarket down the street. This is just one example of how marketing of local products can be misleading.

Additional challenges include the increasing ease with which agribusiness monopolies can take over small family competitors, the abundance of agricultural policies that tend to favor large factory farms, and the common perception, as more and more people lose their connection to rural life, of farmers as faraway producers and nothing more (13). The average customer at a grocery store isn’t connecting human faces
with the food he or she selects from the shelves because our society is no longer based on face-to-face transactions but on lengthy, indirect ones. One of the biggest problems with the globalized food trade is that it often involves regions and nations importing foods that they already produce, replacing the possibility of personal transactions with entirely impersonal ones. This also results in a kind of “food swap” that is wasteful and unnecessary (20). Why should the people of Mexico, the primary source of the world’s corn diversity, be eating corn grown in Iowa? Why should Minnesotans, only a short drive from an internationally-renowned horticultural research program, be eating apples developed and grown in New Zealand? The answer: because imported food is often cheaper and is available year-round, and not enough people care to argue against it.

The growing demand for local food can be seen most tangibly in the popularity of farmers’ markets and subscription farming (in the form of community supported agriculture, or CSA, arrangements), which have proliferated over the past 30 years. In the mid-1970s there were only about 300 farmers’ markets in the entire United States; by 2002 there were roughly 3,100, over a tenfold increase (38). Millions of people now visit them each week, and they are the most basic way for small farmers to take back profits and build meaningful relationships with the people who eat their food. Such people may be the key to a kind of local food renaissance. People need to know that “socially and ecologically sound buying habits are not just the passive result of changes in the way food is produced, but [are often] the most powerful drivers of these changes” (57). Growers can make positive changes in the way that they operate, but without significant demands and support from consumers the results will fall short of what is needed to truly
overhaul our far-from-perfect food system. People respond best to things that affect them personally:

For most of us, the most convincing arguments for eating local will not include abstract concepts such as the tremendous energy use (and thus pollution) associated with hauling food across continents or the loss of crop diversity from consolidation in the food business. The most compelling arguments may instead be psychological and emotional. (57)

The best “psychological and emotional” argument seems to me to be appealing to consumers’ health concerns by emphasizing the increasing security that comes from knowing a food’s origins. Health concerns have successfully caused widespread action. And of course, if personal interactions occur between buyers and growers, the latter can usually make the most appealing arguments themselves.

Consumers tend to feel that the farmer is less likely to take advantage of them than a large supermarket (59), so the major gain in such interactions appears to be a valuable sense of trust. In today’s overwhelmingly anonymous food system, the “ability to interact with the person who knows how the crop or animal has been treated throughout its entire life has become particularly valuable” to the point of being called “a premium” (59). In the food industry the closest term for this premium is *traceability*, which is strongest when the transaction chain between a product’s origin and endpoint is short. This high level of control is especially appealing because it seems increasingly elusive, as everything from food to toys and much larger products comes readily packaged from farther and farther away.

The “constellation of meaningful human connections” (61) that often results when consumers become involved in their local foodshed goes far beyond the food. In a way, it brings people back to the not-so-distant roots of their family and their country. For those who live in cities, especially if they have never experienced other environments, local
food can provide desperately needed connections to “nature, rural ways, rural people, and an awareness of what is happening to our food supply” (61) that will be critical if we hope for progress and preservation in the days ahead. The loss of small, local farms and orchards is about more than just a few individual failures; “[in] the broadest sense, it’s a tale about the loss of rural character, which connotes a certain kind of sociability rooted in the connection to place” (Sacks 31) that Americans are losing at an alarming rate.

Even looking at a single product within one region can be overwhelming, but narrowing my focus makes bringing the above issues to life significantly more manageable. This project is my effort to show why apple orchards (and local food in general) are worth our attention.

III. The Current State of Apples and the Apple Industry

Apples are a product representative of local food issues for several reasons: they are popular among consumers, central to many health and environmental concerns, greatly affected by increases in imported food, and they have a long history in Minnesota that adds to their appeal. The apple industry holds a major place in the United States produce market.

In terms of popularity, “[recent] consumer surveys indicate that apples remain the most frequently purchased fresh fruit grown in the United States” (O’Rourke 59). Therefore, potential changes to apple buying patterns (like encouraging more consumers to buy locally grown fruit) would have a significant impact nationally. One survey found that 97 percent of respondents had purchased apples within the past year, and at least 90 percent of U.S. households buy them monthly (O’Rourke 59). They grow in every state in the continental U.S. and are grown commercially in 36 states, leading to national crops
worth over $2 billion annually (Apple Bits: Core Facts). In 2005, roughly 7,500 U.S. apple growers managed orchards covering 379,000 acres of land and produced fruit that reached the vast majority of American tables. That same year, the average U.S. consumer ate an estimated 46.1 pounds of fresh (whole fruit) and processed apple products (Apple Bits: Core Facts).

Apples matter in an environmental sense because they are among the leading agricultural culprits for high residual pesticides and transportation fuel waste. The Environmental Working Group ranks them second to worst out of 45 fruits and vegetables for the most residual pesticides, giving them 96 out of 100 for highest traceable pesticide load. Some commercial apples that were tested retained over nine pesticides each (Shopper’s Guide to Pesticides in Produce). They are also among a group of agricultural products, made up of fruits, vegetables, frozen foods, and cut flowers, that requires huge amounts of fuel in transport in return for a low caloric value and high water content. One nutritionist referred to transporting these products as “burning lots of petroleum to ship cold water around” (Halweil 18-19). The energy expenditures and resulting carbon footprint of local versus imported apples have been proven to be significantly different (see Appendices B, C). Growing fruit also requires many additional challenges that growing underground vegetables (like carrots and potatoes) does not, because fruit, which is inherently exposed and has a high water content, is more susceptible to temperature, pests, and pesticide residue. The fact that apples are eaten with the skin on, unlike oranges or avocados, makes chemical residues on them especially dangerous. Their popularity places them among the most fragile and most environmentally damaging agricultural products in the United States.
We already have a clear example of what happens to a country’s apple industry when the focus shifts from supporting local growers to those found across the world. In Great Britain, local orchards produced effectively all of the region’s apples until about 40 years ago. Many varieties were grown, meaning that some kind of apple was available and fresh nearly every month of the year (see Appendix D). Now, however, most of the apples found in Britain’s stores have been brought there for less from other places. Over the last few decades British farmers have converted 60 percent of their apple orchards to other crops, and the remaining orchards are dominated by two or three so-called “commercially desirable varieties.” Only 25 percent of apples eaten in Britain today are home grown (Halweil 30).

Crop diversification efforts, local economies, and the environment all suffer as a result of this kind of transition. If the U.S. underwent a similar change, thousands of apple growers would be out of work and many millions of consumers would feel the impact. At least, I hope they would feel it. We are becoming increasingly removed from our food sources, so at some point the shock waves of change may no longer be noticed.

The region around Carleton College happens to be particularly rich for studying not only the apple industry but the issues associated with our food system as a whole. According to economists at the Crossroads Resource Center in Minneapolis, southeastern Minnesota is “a region emblematic of the American Midwest” (Halweil 22) and is therefore a case study with larger implications. The economists found that in 1997, farmers in this region had product sales of $866 million, but their expenses for growing those products – fertilizer, pesticides, and paying creditors, for example – were about $947 million. Only federal subsidies managed to keep most of them in business.
Residents of the area spent $500 million on food, but it went almost exclusively to producers outside of the region. The economists concluded that the current system “extracts about $800 million from the region’s economy each year” (Halweil 22). This cannot continue, or we will no longer have small, local growers and family-run farms as an option for any product, even when it is in season. Understanding the history, hardships, and hopes of one specific industry – that of Minnesota’s apples – may give a glimpse into why locally grown food is worth saving.

**IV. History and Prospects of Minnesota’s Apples**

People feel tied to a place when they are familiar with its history. Families may know land innately if they have lived or worked there for years, though we can also cultivate a connection through learning the story behind an area’s development. Luckily, information about fruit development in Minnesota has been available for the past century and a half. Looking back on the apple’s history in the state reminds us that, for a long period of time, the fruit has had more than just literal roots there. Thinking of the apple industry as a historic food economy rather than simply a recent phenomenon emphasizes the importance of maintaining it.

Today’s orchards owe their existence to early horticultural pioneers who worked tirelessly to develop apples that would grow. Examining antiquated documents gives some idea of how unlikely their success seemed to contemporaries. A 1904 article entitled “Minnesota as an Apple State” has a tone bordering on astonishment: “That successful apple growing in Minnesota is a fact is even yet accepted by many persons only with large mental reservations” (Latham 349). Horace Greeley stated in 1865 “that Minnesota could ‘never raise apples’” (Latham 349), and failures were common during
the mid- to late 19th century. However, the dedication and enthusiasm of Minnesota’s horticulturalists was described even then as “unbounded,” and as far back as 1904 the Minnesota State Horticultural Society had over 1,400 members, making it the largest group of its kind in the world (Latham 350).

It was understood that Minnesota’s success in developing new, hardy varieties would be economically valuable to the Northwest and crucial to the apple’s future in the Upper Midwest, so the pressure was on. At the turn of the 19th century, the Midwest was becoming “the great apple growing region of the world”: as the number of United States apple trees rose about 60 percent from 1890 to 1900, most new trees were planted in the central part of the country (Latham 350). The following advice was given in 1904:

At the present time, with right care and location, the apple crop is the most profitable crop that can be raised in Minnesota . . . One of the best investments for a young man is the development of an apple orchard in Minnesota [because it] is surer than the orange crop in either Florida or California. (Latham 351)

In more than a century since that article was written in celebration of the state’s pomological potential, Minnesota’s apple industry has truly grown to be one of the most notable, though not the largest, in the United States.

Today, apples are the state’s most important fruit crop with an annual harvest of 18 million pounds and a market value estimated to be between $8 and $9 million (IPM Management Manual for MN, September 2007). This makes them an important part of the state’s economy. Its orchards offer the most distinctive assortment of apple varieties in the country, including many rarely found outside its borders such as the Keepsake, Fireside and Haralson (Apple Journal). The state has always put a strong emphasis on supporting the local growers who produce these apples and all of its other agricultural products, and this support and enthusiasm continues to create strong prospects for the
area’s food. Paul Hugunin, Program Coordinator for Minnesota Grown, tells me that in
the twenty years he’s been working in the field the state “has always been a leader in
marketing local food,” largely because its commitment and its funding have been so
stable. Minnesota Grown and similar in-state programs haven’t always been funded as
highly as in other states, yet interest and financial backing have been more consistent
(Hugunin). Today over 1,000 producers are members, and about 150,000 different people
visit the website each year to find information about local food through features like a
new location-based search engine. Local apple orchards have never been so easy to
locate. Getting the word out about local food is the most important step, and for years,
people like Hugunin have made this a clear priority statewide.

An extensive development program at the University of Minnesota’s Horticultural
Research Center employs some of the nation’s foremost apple experts, who are
responsible for unveiling many popular new varieties that are transplanted and sold in
grocery stores and farmers’ markets thousands of miles away. Fully two-thirds of apples
grown in-state today were developed by the U of M (Apple Journal). The most successful
in recent years is the Honeycrisp, which has become nothing short of a fruit sensation. It
was introduced in 1991 and is the product of a 1960 cross of Macoun and Honeygold by
the University research team (Apple Journal); it is arguably the most talked about apple
in the country. The Honeycrisp’s proposed replacement, the recently christened
SweeTango apple, was first unveiled by the U of M in 2007 under the name MN 1914. It
is currently being planted throughout Minnesota and may soon be at the center of a new
national fruit obsession, further solidifying the state’s place at the center of United States
apple development. More eventful years of apple success are ahead if people are
motivated to keep supporting the scientists and local growers who continue to improve the field.

V. The Region’s Climatic Conditions and Their Implications

Minnesota’s apple growers have had to continually prove doubters wrong because they are dependent for their livelihood upon a particularly unforgiving environment. Gaining an appreciation for their work can help convince consumers to support their efforts. The trick to growing apples in the state is finding varieties that will not only survive but thrive in its unique and challenging climate. Though it is more difficult to succeed with apples there, it was always apparent to a group of optimistic growers that it was possible. “Climatic conditions are here similar to those in central Russia, where apples are successfully grown,” insisted H. H. S. Rowell in 1904, “and Minnesota has the advantage of having over 5,000 square miles of water surface in its many lakes” (Latham 349). He then reiterated what those at the state university already knew: “What is needed is [simply] the development of the right varieties” (Latham 349) that can withstand the cold, rainfall, and short growing season.

For those features, more than anything else, are what make growing apples (along with any other fruit) especially difficult in the state of Minnesota. Since it is near the center of the North American continent, Minnesota is in tension between three major climate zones: the boreal forest to the north, the temperate forest to the east, and the temperate grassland to the west (Hoover). “For this reason, drought and flood are as much a part of the state’s climate as ‘normal’ weather” (Climate FAQs), which makes it hard to reliably predict weather patterns and plan ahead.
However, the “cold winters, short springs, and warm humid summers” (IPM Management Manual for MN, September 2007) are almost guaranteed, and they can put great stress on apple trees. The state’s average annual precipitation (which is defined as rainfall plus the water equivalent from snowfall) ranges from nearly 18 inches in the northwest to over 32 inches in the southeast, with roughly two-thirds of that precipitation falling during the warmest months of May through September (Climate FAQs). David Bedford, a lead scientist at the University’s Horticultural Center, points out that the country’s largest apple-growing areas receive significantly less rain; for example, eastern Washington only averages eight to ten inches of rain per year. Each rainfall event increases the chance of infection by serious pests like apple scab (*Venturia inaequalis*) since the raindrops allow spores to germinate and infect green tree tissue. Minnesota growers must constantly be on the lookout for outbreaks, especially in the springtime, which can destroy their crops for the year.

Extremely cold winters dropping far into double digit subzero temperatures have provided unforgiving tests for trees, proving to be too much for all but the hardiest of them; those that survived over one hundred years ago have served as parents to many varieties grown throughout the state today. Minnesota’s growing season is approximately 100 days in the northern and 150 days in the southern regions (where most crops are grown). For comparison, Kansas’s growing season is 160 to 190 days, and Florida’s ranges from 250 days to the entire year along the southern coast (Martin and Lass).

These harsh climatic components dictate where in the state orchards can succeed and where they are almost guaranteed to fail. Very few apple orchards are found north of the Twin Cities because the winter temperatures are too extreme; few are located west of
the Cities because there is not enough rain (Hoover). Other states are drier but they have much more stable temperatures. In a place with frigid winters and a short growing season, high rainfall is needed to make up for lost growth opportunities. Because of this, the vast majority of Minnesota’s orchards are found in the southeastern corner of the state, extending east and south of the Twin Cities to the state’s borders. The four orchards profiled in Section VII are all found in this area.

Those who grow apples in Minnesota must contend with each of the above factors, and there is little room for error if they hope to have marketable fruit in the fall. The frigid winters are too intense for many tree varieties grown elsewhere, and the growing season is too short for others; those that can withstand the state’s seasons often fall victim to pests such as apple scab, apple maggot (*Rhagoletis pomonella*), and the codling moth (*Cydia pomonella*). Historically, the high precipitation and many endemic pests have led to Minnesota growers spraying pesticides more often than their contemporaries in other states, which has made the organic and low-spray movements especially difficult there. However, when growers do succeed (in many cases with less pesticide application), the state’s apples are of superior quality. Dick Madden, who owns a small, private orchard in Waterville, MN, says he doesn’t know what it is about the climate that makes his apples so crisp and sweet, but he has a theory that it just might be the temperature – cold winters give way to warm summers that make them sweet. This is only an idea, but it just might be right. It helps to think that the climate has its rewards as well as its downfalls.
VI. Options for Pest Management

In addition to battling climate, growers wage a ceaseless war against countless types of pests that affect their orchards (see Appendix E). Three main options for pest management exist: conventional, integrated pest management (IPM), and organic. The clearest distinctions between these methods involve the types of pesticides that are used (see Appendix F) and how frequently those pesticides are applied. It is important to note that pest control involves more than just the application of substances, since biological controls, cultural practices, and the development of pest-resistant tree varieties can also be crucial to managing pest populations in orchards. However, pesticides are a contentious issue at the moment and are the subject of many current studies, and disparities in their type and application will be my main focus for explaining pest control.

Today, Minnesota’s producers must carefully consider the three aforementioned options since there is no longer a “default” method (as there was for most of the state’s agricultural history); the simplest choice is no longer the assumed one. Dr. Emily Hoover, a professor in the University of Minnesota’s Horticultural Science Department, estimates that there are about 100 orchards in the state, but neither she nor anyone else I spoke with at the University, the Minnesota Department of Agriculture (MDA), or the Horticultural Research Center could tell me how many orchards practice each of the three types. The breakdown is certainly shifting, though, as fewer growers practice conventional pest management and more are willing to try growing organically.

Conventional (also known as “traditional”) pest management is the oldest and simplest kind, as it involves controlling pests on a regular calendar cycle. For example, a farmer may spray the same broad spectrum pesticide every other Friday evening,
regardless of that year’s climatic conditions or current pest data. This method requires no monitoring and therefore no time or effort outside of set-up and actual spraying time. It stems largely from what several growers have described as the “if it ain’t broke, don’t fix it” mentality: growers find a few pesticides that work well and see no need to alter their routine. Many have sprayed the same chemicals on the same cyclical basis for years.

Conventional spraying can also be practiced on a phenological rather than a calendrical cycle, meaning that pesticides are applied whenever plants reach a given developmental stage. While this is more involved than the calendar approach, it tends to inaccurately assume that pests peak at the same stage of plant development each year (IPM Management Manual for MN, June 2003).

Although what appeals to growers about conventional pest control is that it doesn’t require much extra time or current knowledge, it is not the best option economically since growers must purchase and spray pesticides whether or not they are needed. In Minnesota today, orchards practicing conventional pest management are very rare. In fact, Dr. Hoover states that she “[doesn’t] know anyone who sprays on a calendar anymore. They can’t afford to.” Groundbreaking research in the late 1980s and early 1990s showed growers how to significantly reduce their use of pesticides (especially fungicides), and she adds, “I don’t think anyone’s ever gone back.” When it costs extra money, this isn’t surprising. Some of the growers I spoke with, however, still know a few orchards operating under basically conventional programs.

IPM is the somewhat ambiguous “gray region” between conventional and organic pest management. The 2007 edition of the Integrated Pest Management Manual for
Minnesota Apple Orchards provides a succinct background of pesticide use before IPM and the goals that today make up its definition:

In the twentieth century, scientists introduced insecticides that eliminated all the insect pests in apple orchards. In a few cases, these broad spectrum insecticides caused unacceptably high environmental damage and were withdrawn from the market. In other cases, the major insect pests developed resistance to the insecticides. New pesticides were developed, and integrated pest management (IPM) emerged as a way that apple growers could achieve adequate pest control with less environmental damage. IPM is a program that coordinates pest management activities with other orchard operations to achieve effective, economical, and long-term solutions to pest problems, in a manner that is least disruptive to the environment. (IPM Management Manual for MN, September 2007)

In contrast to conventional production, Hoover – one of the lead contributors to the manual’s 2007 edition – says, “I think you’d find that every grower thinks they practice some form of IPM.” Not only does it make better sense economically, but the environmental benefits are a bonus for small growers because most of them don’t just work but live on their orchards. “It’s their water, their kids’ play area,” she says, so it makes sense for them to use fewer and more target specific chemicals.

This system is based on thresholds. Unlike conventional growers, IPM practitioners do not apply pesticides unless it appears to be necessary. This necessity is determined by careful monitoring of pests and climate, which are tracked by degree-day equations, insect traps, and other means (see Appendices G, H, I). When a major pest is observed to have reached a threshold (or is projected to surpass it), pesticides are used in an effort to control it. IPM growers gravitate toward the most effective pesticides regardless of whether they are synthetic or natural, though attention is increasingly being paid to the most environmentally friendly products. Natural controls and cultural practices are often employed as well; these range from increasing endemic predators to installing pheromone traps to using cows or pigs to eat fallen apple fruit after the season, thus reducing the spread of disease.
Good IPM programs must include knowledge of the crop in question, the biology of the pest species, the local climatic conditions, and the presence or absence of the pests’ natural enemies, and growers tend to be accordingly well versed in these diverse issues. Many of them would prefer to be organic but don’t see it as a realistic possibility. The complicated regulations and monetary issues involved in certification discourage small growers, and IPM provides a way for them to make many positive and feasible changes without committing to being fully organic. One example is John Zimmer, who owns a small apple orchard in Dennison, MN, and is a practicing IPM grower who previously owned an organic vegetable farm. Growing organic apples seems impractical in his current set-up, but IPM has allowed him to use his extensive agricultural knowledge to produce apples in a sustainable, conscientious way. Not everyone who practices IPM takes it as seriously as Mr. Zimmer, though.

The fact that IPM, like the concept of local food, can mean many different things to people is both a benefit and a detriment to its effectiveness. On one hand, because it lacks many formal requirements, it appears feasible and has helped encouraged hesitant farmers to take steps to mitigate their traditional pest management methods. On the other hand, farmers can put in little effort with few tangible environmental benefits and still tout themselves as IPM growers. Still, it is a relief to those concerned with agriculture’s effect on the environment that “the treadmill of conventional pesticide practice” (Harte 132) is no longer the only option or even the default option.

At its best IPM can have significant positive impacts, and the Office of Technology Assessment has estimated that “fully implemented IPM programs for major crops in the United States could reduce pesticide use overall by as much as 75 percent”
The lack of standardization in the program may prove to be a problem, but its future in Minnesota is strong: the state is currently working on the third edition of its IPM grower’s manual, and the MDA has devoted a large portion of its website to IPM definitions and current news. The majority of Minnesota’s orchards are now involved in IPM, which is a major step forward from conventional agriculture.

The third option, which has risen from obscurity into a national phenomenon and major niche market, is organic pest management. Organic growers do not use any synthetic pesticides or fertilizers, but contrary to popular belief, they usually do spray pesticides on their crops. There is a growing list of certified organic products, and some are questionably safe for the environment and people. For example, the Pyrethrins are much-debated organic insecticides that are fast acting, have a low toxicity to animals, and degrade within a day, but they are also a broad spectrum poison that kills any insect and is especially toxic to honeybees. Sabadilla is another example: it is very effective against the “true bugs” but is highly toxic to bees and can be extremely irritating to the mucus membranes of mammals (Iannotti). Sulfur and copper are far from gentle substances but are often used in organic production. However, in Minnesota especially, going entirely pesticide-free is almost impossible for a commercial orchard. Organic pest management still tends to be the most environmentally friendly option of the three when it is practiced by growers who have the environment and public health as their first priority. Some growers have decided to make the switch to organic because it fits more closely with their environmental philosophies while others have done so purely to take advantage of the increasing consumer demand for more “natural” products; regardless of their motives,
these orchard owners are making progress and proving that organically grown apples are, in fact, possible in Minnesota.

Unlike IPM, organic is carefully and rigidly regulated. In the United States, standards are set by the National Organic Program (NOP) under the U. S. Department of Agriculture (USDA). The first national organic standards were decided in 2002 and are regularly updated. Processed organic products fall into three categories: those labeled “100 percent organic” must contain only organically produced ingredients and processing aids (excluding water and salt), while those labeled “organic” must consist of at least 95 percent organically produced ingredients. Processed products with at least 70 percent organic ingredients may state that they are “made with organic ingredients” and list up to three of those ingredients on the main display panel, and products using less than 70 percent organic ingredients may not use the term at all (Organic Labeling and Marketing Information, NOP). Anyone who knowingly mislabels or sells a mislabeled product is subject to a fine of up to $11,000 (Organic Labeling and Marketing Information, NOP).

For products to display these organic credentials, their producers must have been practicing organic agriculture for the prior three-year period. During this transition time, even though the products are fully organic they are not allowed to be advertised as such, which creates a burden for growers who are sacrificing extra money and time for several years without any benefit. This is especially difficult for small, family-run farms and orchards. There is a loophole for the very small producers – those “whose gross income from organic sales totals $5,000 or less” (Organic Labeling and Marketing Information, NOP) are allowed to call their crops organic without going through the intensive certification process – but most local growers fall somewhere between that $5,000 mark.
and the huge profits made by the sprawling, industrialized production centers that supply major grocery chains. To put it plainly, going organic seems out of reach for many of them. Therefore, it may or may not be the best choice for many of our modestly-sized orchards.

So what can consumers infer about an apple with a USDA Organic sticker? If standards were followed correctly, then it was
grown without the use of synthetic pesticides, herbicides, or fertilizers. The apple’s seeds were not genetically modified . . . nor were the seeds or the apple itself treated with irradiation. The fertilizer used on the apple orchard contained no sewage sludge. The apple grower had to keep meticulous farming records. And a USDA-accredited certification agency can visit the orchard at any moment to inspect paperwork and farmland. (Alton)

It sounds pretty good – and it is, or the ideas behind it are. The “organic movement” is making a statement by saying that Americans, as well as people around the world, are tired of eating foods grown with potentially harmful synthetic pesticides. People who eat organic food are generally willing to spend more money to buy food that they think is better for them, better for the environment, or both. This is clearly a positive move. However, organic has increasingly been put up against local food in terms of which is better when a consumer can only have one or the other; this debate will be discussed further in Section VIII.

**VII. Making it Personal: Profiles of Four Local Orchards**

To combine all of the above pieces – the local food movement, the things that make growing apples in Minnesota unique, the different kinds of pesticides and pest management options – and see how they apply to real orchards and people, I contacted four apple orchards in southeastern Minnesota (see Appendices J, K). I couldn’t write about the importance of determining the origin of one’s food without doing it myself, and
I wanted to see if face-to-face communication with local growers was really as important and influential as it sounded. The orchard owners I spoke with were fantastic: friendly, intelligent, and willing to give up their time to help me understand what they did and why. Even in the middle of winter they were busy pruning, planning, and even lecturing, which made their graciousness even more appreciated.

The drive to the orchards made me feel more connected to them. At each, I found a modestly dressed man who was either in the middle of work or looked like he’d just returned from it. They were the definition of unassuming. I studied their trees, played with their dogs, and then sat down in apple shops or kitchens to ask about their history, motivation, and hopes for the future. All were straightforward, realistic, and genuine in their passion for growing apples. I chose two orchards that were very small and two that were larger, two that were organic and two that were not. Conventional pest management and the mega-industrialized orchard were not represented; while these are equally important to understanding the industry, they were more difficult to find or contact and less pertinent to the local food issues I hoped to explore.

The goal of these profiles is to bring to life the diverse information provided up to this point. I want to stress that the apple industry isn’t something abstract or removed. On the contrary, orchards are found close to my college and to the homes of many Minnesotans, and the people who work there are often more than willing to talk about their livelihoods.

Here are perspectives from my four orchard locations, each run by hardworking individuals within a short drive of the Carleton campus. They are listed from smallest to largest.
Orchard #1: The Basics

Name: Madden’s Orchard, Waterville, MN
Owner: Dick Madden
Size: 700 apple trees on 10 acres
# Apple Varieties: 7
# Employees: 0
Sells Commercially To: St. Olaf, 3 local food stores
Pest Management Type: Transitioning Organic
History and Facts: Dick Madden began growing apples in this location in 1988. This will be his third year practicing organic growing, so he hopes to be certified in 2010. His is the one orchard of the four that sells only fresh fruit (no value-added products). Trusty farm dogs Sandy and Maggie eagerly welcome visitors.

Madden’s Orchard is situated off a small gravel road on the shore of Horseshoe Lake, and I imagine it feels like a summer retreat when the water isn’t hidden under several feet of ice. The road leading past the rows of apple trees is hilly and the house and apple shed are at the bottom of a steep, narrow drive. Horses watch curiously as I drive by, following small hand-painted signs pointing the way to the Maddens’ house. The wind is almost gale-force at the main road turnoff but is perfectly calm when I finally park my car near a John Deere tractor.

Dick Madden strides out of his house, accompanied by two very excited dogs. He is wearing tan Carhartt overalls, snow boots, and a blue jacket from his work with “Dick” embroidered on the front. His hair is snow white but he doesn’t seem much older than my parents. We go into his well insulated apple shed to talk a little about his business and his organic transition, and he shows me the bags of new organic products he’s planning to use for the first time this spring. Then it’s time for an orchard tour on the tractor. He drives while I stand on a step, simultaneously trying to hold on, take pictures, and hear him over the icy wind that comes up again as we roll through the rows of trees. Finally, he parks the tractor and we step inside his kitchen. Sandy (a rotund yellow lab who was
dumped at the orchard entrance years ago) continuously rubs her head against my legs as we talk about the orchard.

Madden’s passion is growing apples, but he has another full-time job so he often struggles to balance time between the two. His only help at the orchard is his immediate family and their friends, and his grown son enjoys coming down with a group once per year to help pick and sort apples. Madden hadn’t focused on pest scouting or formally practiced IPM before he decided two years ago to make the transition to organic; however, he says that he’s always tried to use the minimum amount of pesticides that he thinks will be effective. The recommendations for applying them usually refer to covering whole acres, not just the trees on those acres, and he explains that many of his standard trees are often 25 feet or more apart. He also tries to spray pesticides at times when beneficial insects are least active, saying that honeybees, for example, are less affected in the evening than in the middle of the afternoon. Madden never had any major pest problems during his years of minimal pesticide application.

Recently, however, he switched to organic production, and the transition was complicated enough for him to receive his first real blow as an apple grower. When he looked into new, certified organic pesticides, he wasn’t aware that he had to spray some of them earlier than usual. He discovered in June that the product designed to combat codling moth was supposed to be applied in May, and at that point it was too late. Madden didn’t realize the full extent of the moth damage until fall when he began picking his apples, when he found the trademark holes in roughly 25 percent of his fruit harvest. None of those apples were able to be sold and he therefore ran out of fruit much earlier than usual. He’s optimistic that this year he’ll be successful and he’s much better
prepared for pest management after talking with other organic growers at conferences since last fall. One of the main reasons that he was so willing to help me with my project, he says, is that others have recently been so willing to give their time to help him.

His main motivation for the transition is to take advantage of an increasingly lucrative niche market. While not the primary cause, the environmental impact of his former program has also been of concern to him; he tells me, “I didn’t switch because of [environmental concerns], but it’s always weighed on my mind.” He’s hoping that being a certified organic grower will open up new possibilities for him to sell his apples, and he’s been talking to co-ops like Just Food in Northfield that seem like willing customers. When he retires from his other job in the relatively near future, he would also like to spend more time selling his produce at area farmers’ markets. He plans to increase the price of his apples by a modest 10 cents per pound, and he hopes that people will be pleasantly surprised by how inexpensive they will remain in comparison to other sellers.

Over the past few years, Madden has noticed that “[once] you start going organic, people are more likely to tolerate some deformities on your apples” and be more understanding in general, which is an attitude that will help him with the adjustment. Unlike some small growers, he believes that organic growing is feasible in the state of Minnesota; besides, he points out that if it doesn’t work for him, he can always go back to his old system. He’s excited about his new crop of SweeTango apples, though wary of the strange financial dealing behind them; many family-run farms are anxious because no one has ever been able to buy the rights to a variety from the University before.

Madden has learned that people walk into his orchard wanting to purchase apples they are already familiar with. These can be apples they grew up with (like the man who
comes by looking for nothing but Granny Smiths and the older ladies who absolutely insist on buying Haralsons for their apple pies) or apples they’ve heard about from others, most notably the Honeycrisp. These people can be difficult to deal with, especially when Madden doesn’t have the varieties they’re looking for but does have something he believes is comparable or better. His biggest business challenge of late has been running out of Honeycrisp apples, since he’s only managed to harvest about 20 bushels each of the past few years. Customers are so adamant about finding Honeycrisps that they often leave with nothing if they find out that variety is gone. However, he just shrugs as if to say that there’s nothing he can do. If twenty years of talking with people and dealing with their sometimes irrational preferences have taught Madden anything, it’s that “[you] don’t take the frustration personally.”

I ask him why he grows apples, especially while he has another demanding full-time job; he replies, “It’s in your blood. You just love it.” He genuinely enjoys picking apples and pruning trees, and he finds pleasure in making connections with people who come back year after year. Many of the people who stumble upon the orchard once, he says, tend to come back again. These range from families with small children to seasonal duck hunters. His wife’s mother was the best at talking with people, as she spent hours sitting in their small shed chatting with customers about the apples, the weather, and their families. If she wasn’t around when people returned later that year or the next, they would ask for her. These human connections make his apple business more than just an exchange of fruit for money.

When he gets a chance to talk face-to-face with customers at his orchard or an occasional farmers’ market, he always tries to have apples available for people to taste.
He holds out hope that his Connell Reds, a little known variety but his personal favorite for years, will gain some new fans. Madden also emphasizes the good quality of his apples and now his transition to organic, which is always a good conversation starter. Consumers “want someone they think is knowledgeable,” and he communicates this by asking them questions about what kind of apple they’re looking for – cooking or eating, tart or sweet. As mentioned earlier, customers recognize this communication and knowledge as a premium in today’s often detached consumer society. Madden also adds that his wife “is all about presentation” and her apple displays succeed in catching customers’ eyes. It may sound unimportant, but in a modern world where everything is airbrushed and people are used to looking at shiny, waxed apples on grocery store shelves, if produce doesn’t look appealing then it’s probably not going to sell. His wife has also convinced him to keep cats away from the shed while people are shopping, because “[it] makes them think there might be mice around, and no one wants that.” Business sense is necessary for even the smallest growers today.

On his computer, he shows me some pictures of the orchard in warmer weather, pointing through the windows to certain features currently covered in snow. As I’m leaving, his wife gets home from some errands and he convinces her to stand with him for the picture I insist upon taking. I wave goodbye to them, pet some horses on the way out, and head east toward Northfield to be back in time for my afternoon class.

**Orchard #2: The Basics**

<table>
<thead>
<tr>
<th>Name:</th>
<th>Sogn Valley Orchard, Dennison, MN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Owner:</td>
<td>John Zimmer</td>
</tr>
<tr>
<td>Size:</td>
<td>700 trees on 20 acres (apples grown on about 10 acres)</td>
</tr>
<tr>
<td># Apple Varieties:</td>
<td>18</td>
</tr>
<tr>
<td># Employees:</td>
<td>0 (occasional part-time help)</td>
</tr>
<tr>
<td>Sells Commercially To:</td>
<td>2 food co-ops</td>
</tr>
<tr>
<td>Pest Management Type:</td>
<td>IPM</td>
</tr>
</tbody>
</table>
**History and Facts:**  
Sogn was started in the early 1980s by Dennis and Judy Smith. Many of their original trees are still producing fruit. John Zimmer purchased the orchard in the spring of 2007 and converted it from conventional pest management to IPM. Elderly, lovable border collie Pause is the main attraction.

I arrive at Sogn Valley Orchard on a slightly overcast January day, less than 30 minutes after leaving my house in Northfield. The road is snowy, and when I park in front of the “Apple Haus” I see heart-shaped hoof prints left by a meandering deer. There is no sight of John Zimmer, so I peer into the wooden building. He isn’t there. I walk down behind it, past a house and an oversized shed, before he steps out of a door in the latter after seeing me through the window. I apologize for disturbing him and there are a few moments of silence before he invites me into the house next door, where we might be able to sit and talk more easily.

He seems at home in his flannel shirt, dirty jeans, and work boots; I have a hard time imagining him wearing something nice. When he opens the door to his house, his wiry dog Pause rushes out and is ecstatic to see company. She comes with us into the kitchen and repeatedly brings me a tennis ball, hoping I might play with her. Zimmer opens up as we begin a conversation, and he hardly stops talking for the next hour and half. His voice is quiet and even, and he absentmindedly strokes Pause’s head as he shares his opinions on a collection of subjects. I feel like I’m listening to an engaging lecture, and I’m reminded again of the common misconception that people in agriculture tend to be less intelligent or don’t speak well.

Zimmer hasn’t been here for long, but it’s clear that he he’s far from naïve. Before he came to the small orchard about 15 miles southeast of Carleton’s campus he had been an organic vegetable farmer, and he decided he was up for a new location and
new challenge when he purchased Sogn two years ago. He works alone most of the time and prunes about 90 percent of his apple trees himself, which at 20 minutes a tree takes up a great deal of his time. He sees himself as being “environmentally oriented” and has a wealth of information to share about his experiences in agriculture and the future of small, local growers.

Before he bought the orchard, it had been operated for many years under a system of conventional pest management where the pesticides and the apple varieties never changed. The previous owners had a good reputation and had been successful, but Zimmer has long been concerned with environmental issues and wanted to cut back on the regular – and often unnecessary – chemicals. He openly acknowledges that he is “biased on the environmental side” and expresses some frustration with the black and white mode of people’s thinking on subjects like pest control (that “any spraying is a bad thing”) and especially organic (that “food is always best if it has an organic sticker”).

Despite his past success with raising organic produce, Zimmer doesn’t believe that organically grown apples make sense in Minnesota, at least for an orchard as small as his. They tend to look less appealing and therefore don’t sell as well, and for someone who generally works alone and prefers to keep his orchard small and simple, attempting the transition isn’t in his plans. Putting an organic sticker on something is “just one way of saying that it has been grown with the health of the environment in mind”; the label “doesn’t necessarily mean that it’s blessed from the environment’s point of view.” In his experience IPM unfortunately “means nothing to consumers,” so while it’s an expansive, helpful framework for growers to use, touting it isn’t usually effective. If people are looking for a buzzword, it’s organic.
Zimmer also touches on a widely acknowledged issue in today’s apple industry and the produce industry in general: that growers lack simple, accurate terms to describe products or processes that often confuse customers. “‘Organic’ may or may not be the best word to describe what’s acceptable to the consumer” because it doesn’t explain everything about a product, he says, especially where it comes from. “Natural” is too vague, “IPM” uses too many big words, and “green” has been adopted to describe an entire new generation of energy policies (and besides, it wouldn’t make much sense).

The common usage of the word “spray” also troubles him, because he occasionally sprays pesticides on his trees but more often sprays nutrients in a process usually called foliar feeding. The word “spray,” when used in connection with agriculture, has developed such a negative connotation that it’s often hard for Zimmer to communicate the difference. He stresses that adding nutrients like calcium to the leaves safely enhances the growth of his trees, which absorb foliar sprays twenty times faster than nutrients applied to the soil (Phillips 32), but he has yet to come up with a consumer-friendly term to describe the process. Spraying nutrients is especially important in Minnesota because “[cold] soils in spring often limit the uptake of nutrients by the [trees’] root system” (Phillips 32), but the fact that foliar nutrient sprays are applied with the same equipment used to spray pesticides is understandably confusing for people.

Zimmer believes in sustainable and responsible growing and doesn’t think it can only happen with organic production. He believes that we must find a way to apply concepts and words like “humane,” used in reference to animals, to things that grow on trees or in the dirt. That idea, he says, is more important than whether or not a piece of produce has a certain sticker. Words like “ecological,” “low-spray,” and even “apples
with integrity” (Phillips 210) have been suggested, but growers are still searching for the right terminology. Likely there are no magic words.

He states that modern society has the greatest opportunity in history to have fresh fruit all year round – “not necessarily good fruit, but fresh” – and this apparent right to unparalleled choice has become important to many. One question he faces is how to get local customers to buy Minnesota-grown apples instead of those brought in from other states and countries, especially when apples are out of season and the imported fruit may look better and be fresher. He doesn’t know the answer to that question. After Minnesota’s apple season ends, “everything is basically homogenized” and those who may have made efforts to buy local food in the summer and fall often quit thinking about the difference. It’s not reasonable to expect people to eat local all year, but even getting them to think about it is difficult in the winter.

At Sogn, no preservatives are used on fresh fruit or in cider, so while it tastes better it doesn’t keep for as long. It doesn’t take an apple expert to taste the difference between a Minnesota apple without preservatives and a New Zealand apple with them, even if the apples are the same variety; however, the taste difference might not register if an individual doesn’t connect it to the product’s origin. This is a difficult task when consumers are increasingly disconnected from their food sources. For example, Zimmer was recently at a co-op and heard a woman complain loudly (and incredulously) that there was dirt on her carrots. That they grow underground did not seem to occur to her.

He echoes Dick Madden in saying that customers generally buy apples because they’ve heard the name or remember them from childhood (since “we get imprinted at a certain point in our lives”) or simply because they look good (which is why large grocery
store chains wax their apples). He also must constantly try to convince customers to buy apple varieties they walk in knowing nothing about. He loves the little-known Spartan apple, and his customers love it too when they try it; the problem is that he literally has to convince people to buy them one bag at a time. Although people naturally get hooked on shiny surfaces and catchy classifications, he says that they ultimately just want something that tastes good.

Zimmer believes that an important bond is established when a grower can talk to a customer about the products he or she is selling, and he has found that as long as any existing price differences are reasonable, this bond (which often requires just a short exchange to create) tends to overcome the disparity and encourage customers to buy locally grown food. When he delivers apples to Just Food in Northfield or Valley Natural in Burnsville, he tells them when he last sprayed his trees and what exactly he was spraying. Buyers of local food, he believes, “can know and are entitled to know” that information. Because his orchard is so small, he can afford to be picky about the few places he does business with. He explains that “philosophically, we have to be on the same wavelength,” and dealing with small, like-minded co-ops has given him opportunities to come in and talk briefly with people about his products.

In the short period of time he has with people, he tries to highlight three things. First, that his orchard is on Sogn complex soil, which contains a great deal of limestone that sweetens and fertilizes the soil (leading to great tasting final products); second, that he practices IPM, so he carefully counts and keeps track of his spraying so he can share it with consumers; and third, that he works alone and therefore picks for only the following
one or two days, guaranteeing the freshness of his produce. After hearing this information, most customers are sold.

Zimmer grows apples because, he says, “I like to be outside [and] I like to experiment.” He feels lucky that the orchard “affords me the opportunity to do something that is reasonably economically sustainable that pays for me to be outside”; in other words, it combines passion with practicality. Sogn’s small size (there isn’t even a public restroom) and lack of employees mean that he “can take more time and more effort to do things in a sustainable way.” He works every month of the year, pruning, planting, doing maintenance, picking, and selling. From September to November he usually picks apples and works in the Apple Haus from 10 to 14 hours per day, and he seems to be enjoying it. If people take an interest in locally grown things, he states, chances are that they’ll get better quality food – and make some personal connections. It’s the reason for his orchard’s longevity.

The talk finally winds down, and we discuss Carleton, liberal arts, and how ready we are for spring. I offer to host Pause at my house any time if she wants a break from the orchard (which, unfortunately for me, probably won’t ever happen). He shows me a few of his trees and agrees to pose for a picture with his dog before I drive away.

**Orchard #3: The Basics**

<table>
<thead>
<tr>
<th>Name:</th>
<th>Fireside Orchard, Northfield, MN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Owner:</td>
<td>Todd Harvey</td>
</tr>
<tr>
<td>Size:</td>
<td>6,500 trees on 40 acres (apples grown on about 30 acres)</td>
</tr>
<tr>
<td># Apple Varieties:</td>
<td>14</td>
</tr>
<tr>
<td># Employees:</td>
<td>25–30 during peak season</td>
</tr>
<tr>
<td>Sells Commercially To:</td>
<td>2 large grocery chains in the Cities, 5 or 6 other stores, 4 educational institutions (Shattuck-St. Mary’s, Northfield Public Schools, St. Olaf, and Carleton)</td>
</tr>
<tr>
<td>Pest Management Type:</td>
<td>IPM</td>
</tr>
<tr>
<td>History and Facts:</td>
<td>Todd Harvey is a third-generation apple grower, and Fireside was founded in the early 1980s by his father,</td>
</tr>
</tbody>
</table>
Robert. The orchard, conveniently located on Highway 19, runs a major pick-your-own business and sells a wide variety of products until December 31st each year. A 200 pound pumpkin can be seen next to the cash registers.

The first time I meet Todd Harvey, he is in a hurry. It’s September and the shop at Fireside Orchard is full of people milling around, tasting freshly picked apples in the cold room, and waiting in long lines at the registers to purchase pick-your-own bags, pies, and fresh donuts. I’ve watched him coming in and out from the back, sometimes carrying products, other times sweeping the floor or picking up fallen items. He moves quickly and says little – not in an unpleasant way, just constantly busy. When he finally pauses long enough for me to approach him, I introduce myself and assure him that I understand how busy he is and will come back another time. He still takes several minutes to talk with me, and even invites me through the back doors to receive a whirlwind tour of his storage rooms and computerized washing and sorting system. He takes an apple for himself out of a crate and hands another to me. Then he’s off again to deal with his hectic business, and tells me to come back again soon.

I take him up on that. Fireside is only 10 minutes from my college house, so it’s an easy and enjoyable trip to make. I return several times throughout the fall and winter to speak with him and see his orchard as the seasons change and my project becomes more focused. I’m eventually comfortable walking into the shop and waiting in his office if he’s busy talking with employees or finishing a job outside. The office is freezing when it’s cold outside, but if he turns on a space heater, the fluorescent light overhead flickers and gives both of us a headache. Nevertheless, it’s where I first learn a great deal of information about the apple business. Like Dick Madden, he is gray-haired but not old; he walks with quick, decisive steps, and almost always wears some sort of jacket and
black hat with small earflaps. While talking, Harvey smiles often, and when I bring up a touchy issue or praise the way he handles things he has a habit of looking at the floor and laughing softly. He’s always eager to dig through his desk drawer and produce old IPM guides or magazines with articles that might be of interest to me. Like Madden and Zimmer, he has a lot to say in response to my questions.

To begin with, apples are in Harvey’s blood. His grandfather had a 20-acre orchard that grew apples as well as a variety of other fruits. His father didn’t immediately follow in those footsteps, but in 1970, when he was about 40, he decided to leave the corporate world and start planting apple trees in Faribault. Todd Harvey started working with his father in 1987, when Fireside was first becoming established, and they are still business partners. Todd runs all aspects of the orchard but his now 80-year-old father is still around almost every day, often performing smaller tasks that his son doesn’t have time to attend to. While Minnesota’s scattered orchards largely lack organization or marketing clout, Fireside has grown into a successful mid-size orchard aided by its owners’ experience and a prime location next to Highway 19 and I-35. The orchard receives visits from many area residents and from visiting families of St. Olaf and Carleton students, among others.

Harvey prefers to think of IPM as “intelligent pest management,” which says a great deal about why he practices it. He is a self-described nature lover who has belonged to the National Wildlife Federation and Audubon Society for decades, and IPM is a pest management system that he sees as “effective and strategic.” He comments that it is “good environmentally, good for your long-term sustainable prospects, [and] good for food safety” in addition to being flexible and realistic. IPM has taken off in the last 10 to
15 years, and Fireside has evolved with it. Modern chemicals are much more target
specific (although often more expensive), and Harvey believes that growers as a group
have a more sophisticated understanding of the things that affect apple crops, such as the
life cycles of various pests. In many aspects, he says, “[we’ve] come a long way since the
_Silent Spring_ era.” Using “smart pesticides” tends to be more effective and means that
beneficial orchard species can continue to thrive, which increases naturally occurring
biological controls. Harvey makes a conscious effort to keep from harming bees,
ladybugs, and parasitic wasps when he does need to spray pesticides on his trees, and he
believes that IPM “significantly” reduces the amount of pesticides from conventional
spraying methods.

Harvey gives an example of why he’s an IPM grower. About 10 years ago
Fireside suffered an outbreak of leafminers, which are indirect pests that can undergo
three generations in a single growing season. An insect trapping program for local
orchards was encouraged to deal with it in place of applying pesticides. He saw this as
being driven by good intentions but as an unfortunately unrealistic tactic for dealing with
the formidable pests, which threatened to defoliate a huge number of his trees. He
couldn’t risk letting it continue. It is at times like this when he believes controlled, target
specific pesticides are needed.

He comments that “there are a lot of things you have to try and learn from” as a
grower, even if you’ve been in the industry for decades; for example, he waited one year
to spray for scab to see if he could get by without it and saw his scab infections jump up
to affect about 10 percent of his trees. He would be willing to have a five percent loss as a
result of scab if it meant he didn’t have to spray, but without spraying at all his loss
would more likely be “around 95 percent.” He shrugs his shoulders and holds out his upturned hands as if surrendering to the odds. Harvey adds that if a customer finds scab damage or bites into an apple with a larva inside, “the harm is greater than just losing one apple” – he likely loses a customer, and probably other people that person talks to as well. Ultimately his orchard is a business, and sometimes he has to walk a fine line between being an idealist and a pragmatic salesman. Other than the leafminer outbreak, though, he has suffered no serious damages. Even the hailstorms, which have been particularly bad in recent years, have happened to affect Fireside far less than many other orchards.

Harvey sometimes employs foliar feeding, mostly using nitrogen or calcium (which the Honeycrisp trees often crave late in the season) and occasionally zinc, as the process is so effective at getting nutrients directly to the fruit. He doesn’t apply any post-harvest preservatives and has found that the people who visit his orchard widely support the decision. He thinks that adding wax to apples is “unnecessary – customers don’t want that. They actually say, ‘You don’t put stuff on your apples, do you?’” Instead, he has a large cold room in which he stores his harvested apples until they’ve all been delivered, which is usually sometime in February. Only a few varieties are still good at this point and they don’t last much past it, so years such as this one, when he has managed to effectively sell his entire harvest before March, are successes.

As long as what he is doing is responsible and sustainable, he has no plans to transition to organic. The environment remains a major concern for him, though, so if he found that his current program was adding traceable chemicals to the groundwater or causing any negative effects on human health, he would make changes to his program. “I
would love to switch to organic if I could,” he adds, which I assume means, “if I could do it easily while I don’t see it as necessary.” As it is, he doesn’t get many questions from customers about his pest control tactics or demands from them that he switch to organic.

Something that frustrates Harvey on a regular basis is the “irrational,” all-or-nothing view that many people hold about organic or natural food, the same view John Zimmer spoke to me about. Seeing organic as “good” and everything else as “bad,” or “natural” pesticides as “good” and anything synthetic as “bad,” is missing the important distinction that he believes people should be making: “whether things are grown sustainably or unsustainably.” He says, slightly exasperated, that “at this point you really can’t fight the tide” of people thinking that organic is best and everything else is worse. However, as someone who’s been a supporter of IPM for many years he is used to the assumptions, especially because it isn’t a designation familiar to most consumers. He hopes that more pesticides “as good as organic but man-made” will be developed to make it more possible for growers to produce food in a sustainable way and to illustrate to consumers that the differences between organic and non-organic are becoming increasingly blurred. He also hopes that people will become more willing to buy apples grown on disease resistant trees, since he has planted some but their apple varieties haven’t sold well enough to justify planting more.

He remarks that his father talked about quality long before it was a “buzzword,” and he hopes the taste of his produce is the biggest thing to recommend his apples to buyers. When he’s able to talk with them, he stresses that Fireside makes a serious effort to pick apples at their prime ripeness and that the resulting quality “speaks for itself.” He says that his orchard has had a good relationship with high-end grocery stores for
decades, so they must be doing something right. A true believer like the other orchard owners I spoke with, Harvey insists that “Minnesota [apple] varieties are second to none in the world,” and the legions of repeat customers who frequent his store see Fireside as a reliable provider of those unique varieties. While I was talking with him one day, for instance, a middle-aged woman called and came in to pick up a bag of apples, which she continues to get from him after his orchard store technically shuts down for the season. She’s been coming here for so long that they seem to have an understanding, and Harvey appreciates the loyalty of such people.

He will occasionally talk with customers about his family’s orchard history if it happens to come up, and he loves to show people the faded Polaroid picture of his father’s first orchard building, a small white shack a short drive south of here. Fireside is the “fruition” – literally and figuratively – “of a lot of hard work” that combines Harvey’s business sense and passion. Many people have told him that they think the orchard is “a pleasant place to be” with its many acres of trees, flower gardens, and pond, and they truly enjoy coming with their families. Thinking of orchard visits as a fun outdoor activity that is educational, entertaining, and great for bringing people together encourages consumers to make the trip. And, most likely, to keep coming back. It’s worked pretty well for him thus far.

While he doesn’t have any lovable farm dogs around the orchard, he does have a massive pumpkin from last year that he keeps next to the registers. A speech bubble above it informs customers that it is real and will still be around when the store opens again in late 2009. I secretly name it Patrick (I enjoy alliteration) and feel almost comforted by its constant presence. One day Todd agrees to pose for a picture with it as
well as with some trees outside (as long as he can keep his hat on). He always sends me home with a bag of apples, some grapes, or a gallon of cider. It’s nice to know your local growers.

**Orchard #4: The Basics**

- **Name:** Hoch Orchard and Gardens, La Crescent, MN
- **Owner:** Harry Hoch
- **Size:** 8,000 trees on 40 acres (apples grown on about 30 acres)
- **# Apple Varieties:** 50+
- **# Employees:** 4–9 part-time employees and 3–5 full-time interns
- **Sells Commercially To:** Almost exclusively food co-ops, most of which are located in the Twin Cities metro area; no grocery chains
- **Pest Management Type:** Organic and transitioning organic
- **History and Facts:**

  The orchard’s first trees were planted in the mid-1940s, but the majority of its current trees have been planted by Harry and Jackie Hoch since they took over in 1997. The orchard also includes berries, grapes, and other tree fruits. Interns, who can be local or international, live and work on the orchard for the majority of a year in a unique experiential program. No dog, but great views and tractor collection.

The drive to La Crescent is a long one, and most of the way I stare at the faded gray pavement of I-90. When I turn off the interstate, I find myself in a part of Minnesota unlike any I have ever seen. There are hills everywhere: some gentle and rolling, others steep mounds rising abruptly next to the road. A few winding streams cut through dense stands of trees. The dirt road up to the orchard is steep and in some places not wide enough for two cars to pass, so I breathe a sigh of relief when I reach the top without seeing another vehicle. I’ve heard a lot about Hoch Orchard from my local co-op, from people I’ve spoken with on the phone, and from its well-developed website (which includes detailed information on past and current farm practices), so I’m expecting to see a large, gleaming facility under a neatly painted sign. I therefore drive about 10 yards past the actual sign before I realize that I’ve missed it and have to put my car in reverse.
For all its recognition, this place looks so unremarkable that I have to wonder if it’s really the progressive, organic orchard I’ve heard so much about.

After I park my car, I knock lightly on the front door of both houses, but no one is home. Then I hear a tractor rumbling up, and a man in a baseball hat, brown corduroy jacket and jeans hops down. Harry Hoch has a dark beard with gray just starting to appear along the sides; I guess that he’s around 45. I’ve grown to imagine all orchard owners as entirely silver-haired so his appearance is another slight surprise. He invites me into his house to sit and talk, and after, he gives me a brief tour of his orchard grounds before we sit down to lunch with his five workers: two local retired men and three interns from Peru and Brazil.

Hoch clearly knows what he’s doing. My brief visit took months to schedule, since whenever he’s not hard at work on his own orchard (or the smaller “farm two” down the road) he’s hosting meetings or giving presentations at conferences throughout the Upper Midwest. He has degrees in Horticulture, IPM, and Technical Communications and Sustainable Agriculture, and he helped write the original IPM manual for the state of Minnesota. He’s a big supporter of what IPM can do when it’s taken seriously by orchard owners but has recently decided to make the next big leap to organic production. He’s now one of the leading organic growers in the state. For several years, he and his wife, Jackie, have been hosting long-term interns on their orchard. In exchange for providing full-time help, the young people gain valuable knowledge about all aspects of running an organic orchard that they take with them when they return to their local communities, often in other countries. Most of their recent interns have come from the MESA program in California, which gathers foreigners interested specifically in organic agriculture and
arranges for them to work throughout the country. Hoch wants them to have a meaningful learning experience, not simply provide a couple months of anonymous hard labor.

The orchard used to belong to his father, who had it as a kind of side job. When his father passed away in the early 1980s, he and Jackie moved to the orchard where he had spent weekends and holidays while growing up. They lived and worked there for about five years, then moved to the city while his mother stayed on. In 1997, they returned with renewed ideas and energy, and “basically everything has been started fresh since then.” At most, a couple hundred of the old, gnarled apple trees remain on an orchard dominated by orderly young trees. Hoch Orchard now sells whole fruit to food co-ops around the state, as well as a few value-added products (mostly comprised of apple cider and several kinds of jam).

On the addition of these, he says, “I don’t think that you could have a large organic orchard in Minnesota without value-added products,” since growers must have the capacity to use the increased amount of less-than-perfect fruit they grow under an organic system. This makes it difficult for small organic orchards, since they don’t always have the facilities or the money to begin making cider or other things, especially if those products are also certified organic. Ideally, Hoch states, he would like to only sell his produce within 50 miles of the orchard, but thanks to its location in the middle of a highly competitive apple-growing region, it’s crucial to sell some products a little farther away. Even these places, however, are an easy drive from where the apples are picked. In the Midwest, there is “still this ethic that food should be really cheap,” so it’s been a continuous struggle to convince enough customers to pay more for his apples as their price has slowly increased (first when they switched from conventional to “low input,”
then to transitioning organic, and now to certified organic). However, the orchard has a fan base that is growing thanks to people like Strider Hammer at Just Food in Northfield, who at one point had insisted that I take a half gallon of their apple cider home with me.

At the kitchen table, we turn to Hoch’s motivation for switching to organic. Two-thirds of his trees will produce USDA-approved organic apples this year, while the final third will be certified in the fall of 2010. His original plan was to simply have a small line of organic produce to offer, but two things quickly convinced him that it would become too complicated: the difficulty of keeping organic and non-organic produce separated and priced differently on a small family farm, and the inadequate amount of organic fruit to make organic value-added products. I ask him if the decision to convert the entire orchard came from economic or environmental concerns, and without hesitation he replies, “Both.” Hoch points out that organic growing doesn’t necessarily lead to higher returns since the input costs are so high (and the waiting period so long). While it’s nice to get a slightly higher price per organic apple, he is clearly not in it to pad his bank account.

He says that he has always worked to lessen the amount of pesticides he applies to his trees and plants with methods he’s studied and tweaked since his years as a research plot technician with the Horticultural Research Center and the state’s IPM program. Organic growing understandably appealed to him, but he’s had to make several changes to justify producing more sustainable, organic apples as an economically viable decision. Most significantly, he has developed an on-site packing facility to replace the use of a central packing house. Not everyone shares his enthusiasm for new methods, though; he has friends nearby who still operate orchards under basically conventional programs and have no desire to evolve. Growers don’t always get the chance to communicate this
difference to consumers, and he’s hoping that doing business almost exclusively with small co-ops will help spread the word about what makes his apples different. He looks at me earnestly, hands clasped lightly on the table, and says, “If you ask any orchard in the state if they’re doing whatever they can to reduce their environmental impact, they’ll say yes” – no question. It’s all a matter of perspective. It just so happens that he’s doing more than most.

He estimates that organic orchards make up less than five percent of those in Minnesota and less than one percent of the total orchard acreage, so while he’s proven that the program is more than possible, it’s still far from widespread. After talking with him, it seems that the recent transition is only natural for someone who has consistently been so progressive and willing to experiment. Today, he shares his knowledge with almost any grower, buyer, or organization who will listen. He finally pauses, smiles widely, and referencing my original query about his motivation for switching, says, “That’s a lot of words to answer a little question.”

We spend a few minutes talking further about the logic of organic orchards in Minnesota. He tells me that the state had its own organic standards for farming practices before uniform national ones existed, so it’s always been near the forefront of the organic movement. However, actual research into organic production, especially for fruit, is a “fairly recent addition” to its agricultural sector. He echoes everyone I’ve talked to in saying that it’s harder to grow organic produce in Minnesota than most other places in the country (which by this point is no longer a sentiment but a fact), and it’s probably most difficult where he is because the river valley is more humid and home to many deciduous trees, which increases the likelihood of certain pests. He says – apparently not joking –
that in terms of climate, “the best place to grow organic [products] would be in the middle of a cornfield.” Since this isn’t possible, Minnesota’s orchard owners just have to make do with where they are, which can come with some advantages.

With so many challenges, why didn’t he just stick with IPM? Hoch sees IPM, he says, as a great program but one that is nevertheless “just an insect and disease management program,” not necessarily for guiding all aspects of an orchard or farm. Other growers would probably disagree with him, which substantiates the claim that IPM inhabits a sprawling gray area open largely to interpretation. Ideally, he thinks that growers would achieve the best results with a combination of organic and IPM since both have things to offer and shouldn’t have to be mutually exclusive. Regardless of how others run their orchards today, most have taken a significant step forward from the 19th-century Minnesota farmer, who Hoch says might have easily sprayed 30 times per year.

He also has a lot to say on the local food movement in general, and we drift away from apples for a few minutes. The two biggest reasons he sees for buying local are “reducing carbon cycling” and “keeping dollars in the community longer,” with the added side benefit that investing in local agriculture encourages growers to take better care of their land, which is local land. Hoch supports the growing tide of people who say that if local organic produce isn’t available, consumers should buy non-organic local food before they purchase imported organic items. When I ask about prospects for the future of the local food economy in Minnesota, he talks about a recent presentation he attended which found that the state could produce 85 to 90 percent of all the food needed for each of its residents, which is an unusually high number in the U.S. This means that the local movement here “has great potential,” which reinforces my claim that Minnesota is an
important and applicable case study for the rest of the country. Heavy support for local
growers isn’t just appreciated but needed in the state if it hopes to avoid continually
underperforming in terms of its productive (yet sustainable) potential.

After a long pause Hoch announces that he needs to get back to work soon, and
we step out into the bright April sunlight. He gives me a hand-drawn map of the
numerous orchard plots and helps me orient myself by finding the small plot that holds
all of his original organic “experiments” near the entrance. We walk briskly past rows of
trees and through dividing hedges, and he points out different varieties, tree spacing, and
grafting experiments. The grass is still quite dry and largely matted down, but he explains
that during the summer he mows the row spaces on an alternating schedule to give a wide
variety of plants and the accompanying beneficial insects time to grow. I can imagine the
tall, wispy grasses and flowers that must fill the orchard in warmer months, and it makes
me wish I could come back in September to see it. He leaves me to wander on my own
before I sit down to eat with the hired help. I drive away with a full stomach, a jar of jam,
and dozens more pictures than I’ll be able to include in the appendix.

A couple of weeks later I get an email inviting me to a party at the orchard; “good
local food, homemade wine and hard cider, and lots of fun” are promised to everyone
who comes, including “friends, family, colleagues, former coworkers, customers, and
people who like our fruit.” It’s tempting to ignore my homework and go. However, even
though I can’t make it, I feel happy knowing that there will be a gathering of people
eating great local food and enjoying themselves in the process. Ideally, this would be
happening in more places more of the time. I’m crossing my fingers that more people like
Harry Hoch will make it happen.
VIII. The Local-vs-Organic Debate and Cost-Benefit Analysis

You have the background information and real-life examples. Now you’re standing in front of the produce in a grocery store, trying to decide which apples to buy. There are local conventional apples and local organic ones that cost significantly more; or perhaps local IPM apples and imported organic ones. Which do you choose?

These questions don’t have an easy correct answer – or any correct answer, for that matter. They depend on the time of year, the variety of fruit, the price differential, and even the person intended to eat the produce. Theoretically, a consumer can have up to six different apple options at a store: imported conventional, imported IPM, imported organic, local conventional, local IPM, and local organic. Only a couple of general statements can truly be made about the hierarchy of these choices. If quality and price are equal, local apples are better than imported apples, and if price and origin are equal, organic and IPM apples are better than conventional ones. But making decisions in a grocery store is hardly so simple, since local and imported foods are rarely priced the same and IPM and organic apples almost always cost more than conventional ones.

How we should make these choices has been widely explored in the media. The inspiration for an in-depth TIME Magazine article about the “local/organic dilemma,” for example, came from the author’s confusion over apples one day at a grocery store. The question of whether he should buy the organic apple shipped from California or the conventional apple grown nearby in New York sparked an interest in what “local” and “organic” mean to people today, and he set off on a quest to discover which choice was better. After many miles on the road and a great deal of time spent sampling food and talking with people, he comes to a conclusion: “I prefer local to organic, even with the
concessions local farmers must make” (Cloud 5). This isn’t an easy statement to make since both clearly have their merits, but what ultimately makes the decision is that

I would still rather know the person who collects my eggs or grows my lettuce or picks my apples than buy [100 percent] organic eggs or lettuce or apples from an anonymous megafarm at the supermarket. Choosing local when I can makes me feel more rooted, and (in part because of that feeling, no doubt) local food tastes better. (Cloud 5)

In To Buy or Not to Buy Organic, Cindy Burke articulates the common consumer dilemma: “Is it more important to support local growers and your local economy, and thus reduce the amount of fuel used to transport your groceries? Or is it more beneficial to buy organic no matter where that food was grown and how much fossil fuel was needed to get it into your grocery cart?” (4-5). Before proceeding further, it is beneficial to discuss some of the issues surrounding today’s organic industry.

In our society organic food is often seen as ideal food, or even as the only good option for food. Many IPM growers like John Zimmer and Todd Harvey routinely struggle against this perception. The positive buzzwords we use for food are often confused or conflated, so it is important to remember that

organic doesn’t mean local. Organic doesn’t mean that any less fossil fuel is consumed to bring a product to market. Organic used to imply that your food was grown on a small family farm, but that is no longer true, either. And food can be both ‘local’ and ‘organic’ without being ‘sustainable.’ (Burke 5)

In other words, it is not responsible for a consumer to assume that an organic sticker on a product automatically makes it the best available option. One-third of organic produce sold in the United States is imported from other countries (Burke 55), so if supporting local growers is important to a given buyer, he or she should make an effort to see beyond the label.

One grower declared that as soon as the USDA become responsible for managing organic certification, “it allowed the big players to market organics, and a lot of them
have the same old attitudes. You know, they’re making organic Twinkies essentially. They’re doing whatever they have to do to slap the organic label on their products” (qtd. Burke 5). At least 25 percent of all organic manufacturing and marketing is done by major corporations, which rises to 40 percent if one looks solely at processed organic foods (Bittman). As the organic market continues to become more popular and therefore more lucrative, the values we associate with organic food may become increasingly rare in its production. Within any system of pest management there will be a wide spectrum of growers’ attitudes; there will always be those who try to do the right thing and those who are willing to cut corners as long as they can still get by. Burke comments that “[instead] of organics changing the world for the better, it seems that, sadly, the world is changing organics” (10).

This isn’t to say that the most progressive, concerned, and environmentally friendly orchards are no longer organic. Many of them are, and they see organic growing as the best way for them to make a difference. Yet organic certification doesn’t automatically stamp a product with that description, and a highly conscientious, innovative, and committed IPM farmer can (and probably will) produce apples as sustainably or even more so than his or her organic competitors. As synthetic pesticides become more target specific and less long lived, they may become more environmentally friendly than most of the organic products available today. While organic growing stems from positive intentions, consumers need to be aware of the common corruption of its ideals and be careful not to discount non-organic apples in their decision making. It’s becoming more commonly understood that “most farmers who practice truly sustainable farming, or what you might call ‘organic in spirit,’ operate on a small scale, some so
small they can’t afford the requirements to be certified organic by the government” (Bittman). These growers are intimately involved in their fruit production, and their knowledge and environmental philosophies are often worth more than a USDA sticker.

Something that has already been stated but should be abundantly clear here (and from the above orchard profiles) is that talking with the person who grows the food in question can provide a great deal of valuable information. Just as it’s not necessarily true that organic growers care more about the health of the land than IPM growers do, the smallest orchards may not always pay more detailed attention or make better choices than larger orchards. “The distance between people and farms has created a disconnect between the farmer and the consumer that didn’t used to exist” for most of our agricultural history, and now “[the] ‘certified organic’ label is simply a substitute for knowing and trusting the farmer who grows your food” (Burke 11-12). Consumers don’t have to simply accept that, and they shouldn’t.

If speaking face-to-face with a grower isn’t an option – and it often isn’t, particularly outside of a farmers’ market setting – then consumers can try to find a grocery store or co-op whose produce buyers they feel they can trust. Strider Hammer at Just Food in Northfield is an example of such a buyer, as he holds growers to high standards and therefore only brings produce into the store that he, and his customers, can feel good about. He tells me that approximately 10 percent of Northfield’s homeowners are frequent Just Food customers. His knowledge and personal requirements for the fruit and vegetables he sells act as a kind of buffer for all but the most sustainably-grown food, and this brings peace of mind to the hundreds of people who come to him for their produce.
The fact remains, though, that trying to make the best decision when buying food is complicated. No simple chart will be a consistently effective guide for consumers standing puzzled in front of a variety of apple choices. However, some guidelines and examples can be provided to help educate buyers, empowering them to evaluate the given options and make the best choice.

Published studies and quantitative equations are both effective tools in a cost-benefit analysis involving food options. For example, the Environmental Working Group (EWG) came out with a study and “Shopper’s Guide to Pesticides in Produce” in 2004 that provides useful information about the amount of pesticides typically found on 45 kinds of fruits and vegetables. Apples rank second on this list arranged from worst to best, with first place being the produce item with the most residual pesticides (peaches) and last being the item with the fewest (onions). All of the fruit and vegetables were first prepared as they would be in a household kitchen, which included rinsing them. Apples scored 96 out of 100 for highest pesticide load. The average sample had 2.8 traceable pesticides, with over 50 different pesticides found on all of the apples tested. Out of the total sample, 93.6 percent had detectable pesticides (“Shopper’s Guide”). In terms of a cost-benefit analysis, if a consumer is concerned with traces of pesticides on his or her food (for health or environmental reasons), apples are one produce item that he or she should strongly consider buying from organic or IPM orchards, even if they cost more. Small, local growers will likely be able to provide more information to consumers about what and when they last sprayed, so buyers who talk with them can at least have a good idea of what they are purchasing.

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2 An updated version was just released in March of 2009, available at http://www.foodnews.org/fulllist.php. The information here is from the 2004 guide; however, the new findings on apples have hardly changed.
Burke lists apples at number eight on her “Dirty Dozen” list, which ranks “the twelve foods to eat only if they’re organic” (83). Her research shows that “[apples] are consistently among the most contaminated fruits and vegetables” because “after being washed, cored, and peeled, an average conventionally grown apple contains the residues from four to ten different pesticides known or suspected [to be harmful to humans]” (Burke 96). Her recommendation is to “buy organic or minimally treated apples” (96) if consumers are at all concerned about such issues. Burke and the EWG prioritize in similar ways by communicating what foods are most prone to pesticide residues, making their advice sound more feasible to hesitant or cash-strapped consumers who may not want or be able to buy entirely organic produce.

Equations containing concrete or easily definable variables to measure “benefit” or “quality” are hard to find, but Burke has created a helpful, if fairly subjective, formula to help herself decide when it makes sense to select local food. The equation is

\[ B = \frac{(Q - \frac{1}{2} M)}{t} \]

where \( B \) = benefit, \( Q \) = quality (on a scale of 1 to 1,000), \( M \) = approximate miles product has traveled, and \( t \) = time to obtain (from house to store). The product with the highest “B” value is most worthwhile to purchase. The quality scale refers to a product’s expected appearance and taste, and an average, in-season piece of produce has a quality of 500 (Burke 80). Burke then provides two example scenarios, which are as follows:

**Situation 1.** I can either buy organic lettuce at a nearby grocery store that is shipped from 801 miles away, or local, conventional lettuce from another grocery store that is 15 minutes farther from my house. What should I do?

- Organic, imported lettuce: \( B = \frac{600 - \frac{1}{2} (801)}{30} = 6.65 \)
- Conventional, local lettuce: \( B = \frac{300 - \frac{1}{2} (100)}{45} = 5.5 \)

Therefore, the organic, imported lettuce provides more benefit.
Situation 2. At my local supermarket, should I buy conventional grapes from California or organic grapes from Argentina?

California grapes: $B = \frac{[500 - \frac{1}{2} \times 801]}{30} = 3.31$
Argentina grapes: $B = \frac{[500 - \frac{1}{2} \times 7,000]}{30} = -100$
Therefore, the grapes from California provide more benefit.

The “quality” rating is clearly approximate and subjective, making this formula questionably reliable; nevertheless, it is an intriguing idea that provides one way for consumers to compare their options. Much of the cost-benefit analysis for deciding between produce options will always include subjective measurements, but getting buyers to at least think about such dilemmas is a necessary and encouraging first step.

There is a need for more accurate, accessible, and concrete cost-benefit suggestions like the above, and I believe the shortage of such information is inhibiting the average shopper’s education. When I ask Dr. Hoover for suggestions on other cost-benefit perspectives, she says, “I know no one in Minnesota who’s doing anything like that,” adding, “We have very few people working in horticultural marketing in the country,” especially in the area of clear buying recommendations. Thanks to groups like Minnesota Grown, it’s true that Minnesota has one of the strongest and most consistent networks among all states for promoting local agriculture as a whole. Yet objective recommendations for how to choose between many food options at various times of the year – especially when local produce isn’t always an option – are still lacking. While it’s exciting to be doing work in an underserved area, I hope that more people can devote their time and knowledge to evaluating how consumers can best make decisions in such a crucial area.
IX. Recommendations for Consumers

It is easy to become overwhelmed by the information related to growing and purchasing produce in today’s fast-paced world, especially because understanding it often takes time and effort that people don’t feel they can spare. Any effort, though, is better than nothing. Becoming more self-aware as a consumer is one of the most important things that people can do; I point again to the statement that consumers, not big corporations, have the potential to be “the most powerful drivers” (57) of a local food revival. “Every time you make a purchase, you are telling businesses and farmers that you value that method of growing, harvesting, producing, and shipping that food,” says Cindy Burke. “If you don’t think big businesses care about how you spend your food dollars, think again. That’s actually one of the only things they care about” (64). You may think that your monetary endorsement of a product won’t have any effect, but if thousands or millions of people like you make the same statement with their money, it becomes very significant.

It seems like an overly obvious statement, but people often seem to forget that trends in consumer spending drive all production trends. If enough average consumers begin to think critically about different options that may be presented to them, the quality of the food industry will benefit. Being increasingly wary of common misconceptions and widely held assumptions will serve the same purpose. The more people who realize that labels cannot be a substitute for knowledge, that blanket rules for decision making hardly exist, and that very few agricultural issues are black and white, the better our collective decision making will become.
It is also beneficial to have more specific recommendations than simply “increase your self-awareness,” which, while helpful, is rather abstract. First and foremost, attempt to talk with local growers who can provide detailed information about and a personal connection to the apples and other food that you buy. “When you buy food from people you know, you know their values, and you know if they seem genuine” (Burke 63), which can be difficult to determine without a face-to-face interaction. Buying food directly from a local farmer is a good alternative to simply buying organic food, which may or may not be the right choice. Find some way that works for you to do your own sort of cost-benefit analysis for different types of produce, whether it’s looking up a given fruit or vegetable’s pesticide ranking, using Burke’s formula, or some other method. If you are not able to talk to your local growers, especially during winter and spring when farmers’ markets aren’t in session, try to find a store or buyer that you can trust to carry responsibly grown food. This takes pressure off of you to always have to decide if you can feel good about the things you’re buying.

The average consumer can make a difference by doing simple things. These include learning what local foods are in season and planning meals around them, even for a few times per week; shopping at a local farmers’ market; asking favorite food stores or restaurants to stock locally grown food; taking trips (especially with children) to local farms to learn what they produce; and planting a garden at home (Halweil 58). Simply eating more of a food when it’s in season and less of it when it’s not can also have a significant impact. This doesn’t mean that you shouldn’t ever buy apples in April, but that you should try to buy more of them in September or October when they’re widely available. Techniques of preserving fruit by canning or making jam have been widely
lost, and experimenting with them can be a fun family activity for those who are a little more dedicated.

Eating exclusively locally grown food is almost impossible for anyone who wants to maintain a balanced diet or have access to basic food conveniences, and even the most steadfast proponents of local food know it. Burke states that if she committed to solely eating food produced within 100 miles of her house, “I would only be able to find salad greens, a variety of seasonal vegetables, and chicken or beef. No pasta. No coffee or tea” (68). There are people so dedicated to the local cause that they are willing to give up these things, but the vast majority of consumers will not and cannot be expected to do so. However, as more people read books like Michael Pollan’s best-selling *The Omnivore’s Dilemma* and become concerned with where their food is coming from, it should become easier for them to make certain changes in the ways they think about or purchase food. Hopefully the information presented here encourages readers to think for themselves and to find in the process that local food deserves an important place in their lives and diets.

**X. Closing Thoughts**

The issues associated with Minnesota’s apple industry and with local food in general are enormous, and this paper is only able to provide a surface-level introduction to most of them. I have tried to highlight areas that will both show consumers why this is an important subject to learn about and help them gain at least a basic understanding of it. I want the above information to be useful and the advice to be realistic. I believe there is such a thing as pragmatic idealism – being hopeful, yet taking feasible steps toward making those hopes a reality – and the recommendations I have provided have been made with pragmatism in mind. It is not productive to expect people to revolutionize their
habits overnight or to sacrifice everything they enjoy, but I think it is feasible to encourage them to question their assumptions and consider changing some of their habits, especially if they can be convinced that doing so is in their own best interest. If consumers can realize that the ideal food options are not necessarily always local or organic but **sustainable**, we will see serious progress in the way we think about food. For “[the] guiding philosophy of sustainable farming is balance – balancing the needs of the land, the community, and the farmer – to create a viable, healthy ecosystem” (Burke 67), and I believe this sense of balance is the ultimate goal. Through my research, I have found that local food is very often sustainable food.

In the future, I would be thrilled to see an increased emphasis on face-to-face interactions between growers and consumers, a widespread combating of commonly held “all-or-nothing beliefs” about agriculture and pest management, the development of more suitable terminology for discussing certain types of products and practices, and a shift to seeing the availability of all kinds of fresh food at any time of the year as a privilege rather than a right. Much of what needs to be fixed today stems, I believe, from taking food for granted.

My research from academic sources and especially from the local community has opened my eyes to several projects that I would love to tackle if I had more time. Hopefully someone else will be inspired to take on one or more of them sometime in the near future. First, I would like to work with Northfield-area schools to encourage them to take all children on field trips to local farms and orchards and begin to educate them about local food issues, since, as John Zimmer said, “Young people are the future of food awareness.” I would like to work with Carleton’s food service provider to make sure it
not only continues but increases its commitment to serving as much local food as possible, and encourage it to buy more apples from smaller growers than from the large operations with which it currently does a large amount of business. And I would like to work with food co-ops and other progressive stores to start programs that bring growers in to speak with customers on a more regular basis, since I’ve seen how much impact even brief personal interactions like these can have on consumers, including myself. It would be fitting for other students to carry these goals forward. A recent article pointed out that “liberal-arts colleges, dedicated as they are to holistic education, appreciate the inextricable link between healthy agriculture and healthy communities – and the necessity of putting ‘culture’ back in ‘agriculture’” (Sacks 32). The above projects are designed to do just that, and I hope future students at Carleton and other colleges will emphasize the importance of being educated food consumers and drivers of change.

I have learned an incredible amount from this project, which more than anything has taught me that I have a great deal left to learn. It has made me a more conscientious and curious consumer and has challenged me to see food issues as the complex questions they are, not the black and white choices they often unfortunately become. I will never again pick up an apple from a store shelf without wondering where it came from, who grew it, and how it got there . . . in short, I will never again take that apple for granted.
Acknowledgments

Many people and groups deserve thanks for their help with this project. Thank you to: The Carleton ENTS department for showing me that environmental studies is truly an interdisciplinary area, and for giving me the freedom to design a project that is entirely my own. My advisor, David Hougen-Eitzman, for his continued assistance and suggestions. Mark Kanazawa for his support and guidance as I shaped my proposal. Strider Hammer, David Bedford, Paul Hugunin, and others for sharing their expert opinions. The Carleton English Department for forcing me to write, and write, and write. My friends and family for looking over many versions of brochures and for putting up with me while I talked constantly about apples for the past ten months. And especially Todd Harvey, John Zimmer, Dick Madden, and Harry Hoch for taking time out of their busy schedules to show me their orchards, answer my seemingly endless questions, and give me a glimpse into their apple-filled lives.
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Secondary Sources


Appendices

Appendix A: How Far Do Most Non-Local Food Items Travel?

Iowa, another Midwestern state, can grow or raise all of the food items listed below. However, they are imported more often than grown locally. This shows typical places of origin for these often unnecessarily imported items and the distances those items must travel to reach an Iowa family’s table. (One kilometer = 0.62 miles)

![Figure 3A: Local Versus Imported Ingredients: Iowa](image)

The foods going into an “All-Iowa” meal traveled an average of 74 kilometers to reach their destination, compared with 2,577 kilometers if they had been shipped from the usual distant sources nationwide. Researchers estimated that local and regionally sourced meals entailed 4 to 17 times less petroleum consumption and 5 to 17 times less carbon dioxide emissions than a meal bought from the conventional food chain.

From *Home Grown* by Brian Halweil, page 18
Appendix B: Food Energy Breakdown

Red circles indicate areas greatly influenced by the distance food must travel from where it is grown to where it is sold.

Appendix C: Difference in Carbon Footprint

The chart below measures differences in global warming potential between local organic, local conventional, and imported conventional food items, including apples.

From “Keeping it Local for a Green Thanksgiving” by Jennifer Langston at http://seattlepi.nwsource.com/local/337958_carbonmeal03.html
Appendix D: British Apple Availability

Before UK residents began importing the majority of their apples, they had fresh local apples available nearly all year round.

From *Home Grown* by Brian Halweil, page 31
Appendix E: Understanding Pests: Definitions and Categories

- An orchard pest may be defined as any organism that causes direct or indirect harm to crops in the eyes of humans; these pests may be insects, vertebrates, fungi, or bacteria.

- Pests are classified in two main ways: by the part of the plant they harm or by their economic importance (normally a result of the seriousness of their infestation).

- Classification by the part of the plant that is harmed:
  - Direct pests affect the apple fruit itself, and can include both “internal feeders” like the codling moth (Cydia pomonella) and external pests such as the leafroller (Archips argyrospila). When the fruit is damaged, it is generally unmarketable.
  - Indirect pests affect other parts of the apple tree such as the leaves and bark, potentially resulting in less leaf area, dead branches, or poorer fruit quality or yield. Examples of these pests include aphids, mites, and leafhoppers. Their damage doesn’t impact the fruit itself, but can kill the trees.

- Classification by economic importance:
  - Key pests cause major damage each year unless they are controlled.
  - Minor or secondary pests only become a serious issue as a result of unusual climatic conditions. Secondary pests can be tolerated in small numbers and are not typically of serious importance to growers, although they can hurt crop yield if beneficial insects that normally control them are wiped out by broad spectrum insecticides.

Appendix F: Understanding Pesticides: Definitions and Categories

- **Pesticide** is an inclusive term that may refer to insecticides, fungicides, herbicides, rodenticides, or other methods of pest control.

  - **NOTE:** In this paper I rarely distinguish between the specific kinds of pesticides, preferring to use the general term for simplicity’s sake.

- Pesticides can be classified in different ways:

  1. As either restricted use or non-restricted use:

     - **Restricted use pesticides**, which represent the majority of those found in orchards, meet certain toxicity or environmental impact criteria. Growers who use them must obtain certain pesticide applicator licenses.

     - **Non-restricted use pesticides** have been tested and shown to be more or less harmless to the environment.

  2. As either natural or synthetic:

     - **Natural pesticides** are produced from naturally occurring sources, such as plants or trees.

     - **Synthetic pesticides** are manufactured by combining chemically processed compounds. Synthetics are not allowed in organic agriculture.

  3. As either broad spectrum or target specific*:

     - **Broad spectrum pesticides** kill a wide variety of pests as well as benign or beneficial insects.

     - **Target specific pesticides** only impact the pest in question.

  * I have heard the [somewhat strange yet effective] analogy that the former can be represented by a grenade and the latter by a rifle.

  * Target specific pesticides are more difficult to produce and are therefore less common and tend to cost more, though their popularity is increasing as agricultural technology and levels of environmental concern also go up.

  * Many broad spectrum pesticides were removed or further restricted by the Environmental Protection Agency (EPA) after the 1996 Food Quality Protection Act (IPM Management Manual for MN, June 2003).
• Pesticides can affect their targets in various ways, including:
  - acting as nerve or stomach poisons
  - causing suffocation
  - interfering with hormone growth regulators
  - inhibiting other cellular processes

• There are two time intervals that any grower who uses pesticides must observe:
  - The re-entry interval (REI) is the minimum number of days or hours before an orchard can be re-entered after a pesticide application.
  - The pre-harvest interval (PHI) is the minimum number of days required between the final spray of crops and their harvest.
  - See the *IPM Management Manual for MN*, September 2007 for more information.

• Depending on what type of pest management is practiced, orchard owners may keep few records or meticulous records of when and how often they spray.
Appendix G: Using Degree-Days to Track Pest Levels

This example shows how degree-day equations are used to calculate pest thresholds and therefore infection potential; the spores in question below cause apple scab.

From *The Apple Grower* by Michael Phillips, page 133
Appendix H: Using Rain and Temperature to Track Pest Levels

Again, the spores that cause apple scab are the subject of this figure. Minnesota’s summers have many days of warm temperatures and heavy rainfall, which, as shown, result in about 90 percent of possible spores being released. On a 70 degree day, only 6 hours of leaf wetness are required for an infection to take hold.

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**GAUGING SEVERITY OF POTENTIAL SCAB INFECTIONS**

Table 1: Percentage of available ascospores that will be discharged under various environmental conditions

<table>
<thead>
<tr>
<th>TYPE OF RAIN EVENT</th>
<th>PERCENTAGES OF AVAILABLE ASCOSPORES RELEASED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Night rain only</td>
<td>5%</td>
</tr>
<tr>
<td>Day rain, temperature &lt; 50°F, rain &lt; 0.10 inches</td>
<td>25%</td>
</tr>
<tr>
<td>Day rain, temperature &gt; 50°F, rain &lt; 0.10 inches</td>
<td>50%</td>
</tr>
<tr>
<td>Day rain, temperature &gt; 50°F, rain &lt; 0.30 inches</td>
<td>50%</td>
</tr>
<tr>
<td>Day rain, temperature &gt; 50°F, rain &gt; 0.30 inches</td>
<td>90%</td>
</tr>
</tbody>
</table>

Table 2: Revised criteria for leaf infection by ascospores of *Venturia inaequalis*. Times represent the minimum hours of continuous leaf wetness required for infection at each temperature.

<table>
<thead>
<tr>
<th>TEMPERATURE (°F)</th>
<th>HOURS*</th>
</tr>
</thead>
<tbody>
<tr>
<td>34</td>
<td>41</td>
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<tr>
<td>36</td>
<td>35</td>
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<td>37</td>
<td>30</td>
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<td>59</td>
<td>7</td>
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<td>61-75</td>
<td>6</td>
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<tr>
<td>77</td>
<td>8</td>
</tr>
<tr>
<td>79</td>
<td>11</td>
</tr>
</tbody>
</table>

*When rain begins after sunset, leaf wetness should be assumed to begin at sunrise. For all other events, times should be computed from the start of rain.

Sources: David Godshalk, Robert Seem, Arne Stensvand, Stuart Falk; New York State Agricultural Experiment Station at Geneva.

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From *The Apple Grower* by Michael Phillips, page 132
Appendix I: Popular Pest Scouting Equipment

Common types of pheromone dispensers and traps used in orchards for pest scouting:

- Pheromone dispenser (rubber septum)
- Pherocon VI “Delta” trap
- Delta trap liner
- Pherocon AM
- Red sphere (ball) trap
- Ladd trap
- Circle trap
- Pyramid trap
- Grandisoic acid lure

From the *IPM Management Manual for MN, September 2007*, page 15
Appendix J: Approximate Locations of Four Orchards From Profile Section

My home base at Carleton College is located just east of Point A, in Northfield.

Key
A: Fireside Orchard (Northfield, MN)
B: Sogn Valley Orchard (Dennison, MN)
C: Madden’s Orchard (Waterville, MN)
D: Hoch Orchard (La Crescent, MN)
Appendix K: Photographs from the Orchards

Madden’s Orchard
Fireside Orchard