2007

Gardening programs in schools: A proposed solution to reverse the consequences of the current American food culture

Charlotte Grace Blessey

GARDENING PROGRAMS IN SCHOOLS: A PROPOSED SOLUTION TO REVERSE THE CONSEQUENCES OF THE CURRENT AMERICAN FOOD CULTURE

By
Charlotte Grace Blessey

A thesis submitted to the faculty of The University of Mississippi in partial fulfillment of the requirements of the Sally McDonnell Barksdale Honors College.

Oxford
May 2007

Approved by

Advisor: Professor Minjoo Oh

Deborah Chessin

Reader: Professor Deborah Chessin

Edward B. Sisson

Reader: Professor Edward Sisson

ABSTRACT
CHARLOTTE GRACE BLESSEY: Gardening Programs in Schools: A Proposed Solution to Reverse the Consequences of the Current American Food Culture
(Under the direction of Minjoo Oh)

This thesis examines the problems with current food consumption and production practices, and proposes the implementation of school gardening programs as a possible remedy to these problems. Methods and procedures consisted of research on current publications, periodicals, internet sources and scholarly articles concerning these topics. It was found that current diet is a significant factor in widespread health problems facing populations today. This diet is intertwined with an environmentally destructive and vulnerable system of intensive industrial agriculture based on centralization, mass distribution, and standardization. School garden programs target children beginning at a young age and help to counter the culture of consumption and waste being instilled elsewhere. Such programs have been demonstrated to raise participants' academic achievement, improve diet and eating habits, and effectively teach ecology and conservation. Ultimately, school gardening programs may prove themselves to be important agents of change within the current problematic fast food culture.

TABLE OF CONTENTS

INTRODUCTION

During the course of the 20th century, the way people eat was radically transformed. The American food production system converted from a predominantly local, community-based agrarian society to one which is consumption-obsessed, with speed and convenience dependent on the mass-homogenization and standardization of food on every level. Huge industrial farms manned by massive corporations now dominate markets, forcing family farmers out of business while shamefully polluting air, water, and soil as they strive for ever-greater profits utilizing an ecologically precarious system. Convenience and fast food have taken obesity and heart disease in the United States to epidemic proportions. As if this were not enough, as a result a tragic disconnection between people and their food has been created, and a wealth of knowledge about food, the culinary arts, the land, and nature has been lost.

These problems are deeply entrenched in our culture and will not be easily rectified. Yet, I believe one of the best ways to begin healing the wounds of our so-called "Fast Food Nation" is by educating children, so that values of the Slow Food movement, explained in detail in Chapter Two, will become a new (and better) way of life. Garden programs in schools are ideal and effective ways to accomplish this goal. Such programs have been shown to compliment traditional classroom settings and increase academic achievement (Smith and Motsenbocker 2005, Graham and Zidenberg-Cherr 2005). They

have been shown to improve children's eating habits (Hermann, Parker, et al. 2006, Graham and Zidenberg-Cherr 2005), which is crucial in an age when children are the fastest growing demographic group suffering from obesity. The gardens teach principles of ecology and conservation, enabling the next generation to better take care of our world. And, just as importantly, these children then hopefully grow up into adults able to make responsible choices and pass that knowledge on to their own children.

Much of the literature covering Slow Food tends to concern itself more with the aesthetic, loftier aspects of the movement (Kummer 2002, Petrini 2001). In this thesis I have chosen to put more emphasis on the practical benefits and how they directly address the most pressing issues surrounding American diet and food production, such as health and environmental welfare. There is certainly merit in the Slow Food values of appreciating food for its taste, individuality, and the human labor which created it, as well as the sense of community and conviviality Slow Food seeks to revitalize. However, when I state that school gardens should be a very common, if not required, part of the curriculum in schools everywhere, I make such a suggestion while thinking more on the values of gardens in improving health, diet, and nutritional education, academic achievement, and the ability to make environmentally responsible choices.

Chapter One introduces a detailed description of the cultural, environmental, and health problems facing humans and the environment today which are either directly or indirectly linked with our current food production and consumption systems. Chapter Two describes Slow Food, an ideology which, if adapted, has the potential to alter the negative aspects of our culture outlined in Chapter One. It then introduces school gardening programs, which I believe are a promising means of encouraging the

adaptation of Slow values in future generations. Chapter Three examines three case studies of school gardening programs, two at the elementary school level and one at the university level. Finally, in Chapter Four I look at several scientific articles whose findings support the case studies. The findings also hold up the validity of my statement that school gardening programs are an effective way to improve children's academic achievement, personal well-being, and environmental awareness.

CHAPTER ONE

THE CURRENT AMERICAN FOOD SYSTEM AND ITS CONSEQUENCES

The way we eat is grounded in how our culture treats food. Because of this, the problems which have grown out of this culture are ubiquitous and, once recognized, difficult to solve. A frequently quoted term coined by sociologist Benjamin R. Barber also serves here to illustrate succinctly what has happened to our food culture: we now live in a "McWorld" (Schlosser 2002:229). The term "McWorld" symbolizes "the onrush of economic and ecological forces that demand integration and uniformity and that mesmerize the world with fast music, fast computers, and fast food—with MTV, Macintosh, and McDonald's, pressing nations into one commercially homogenous global network: one McWorld tied together by technology, ecology, communications, and commerce" (Barber 1992:1). Fast food chains do represent a neat, condensed picture of what has happened to the way people expect to experience food and eating across the country, and increasingly worldwide. The phenomenal success of fast food and other restaurant chains has allowed people to accept the extreme homogenization of our food supply – and not just what types of food we eat, but how and where we obtain them as well. Principles like quantity over quality, mass homogenization and standardization, common setting and experience, replacement of human skills with technologies, and of course efficiency, have become the defining characteristics of food systems today (Ritzer 2003).

A. A Lack of Awareness

Perhaps strangest of all is that for the first time in history, most people know very little about how their food has been made or where it comes from. In the last century Americans have transformed from a nation of farmers to a nation of consumers with no true connection to their food (Kimbrell 2002). The American landscape, economy, workforce, and popular culture have all evolved to embrace (or simply keep up with) this juggernaut of homogenization and so-called modernization (Schlosser 2002). Franchises and strip malls built to service freeway traffic are now commonplace while unique and private businesses have declined dramatically. The 20th century saw the widespread industrialization of agriculture (Kimbrell 2002), the consequences of which will be examined more thoroughly later. Indeed, if there is one theme that arises time and again in the literature, it is the idea that "the low price of a fast food hamburger does not reflect its real cost – and should. The profits of the fast food chains [as well as agribusinesses and other conglomerates such as PepsiCo] have been made possible by losses imposed on the rest of society" (Schlosser 2002:261).

Consider the average visit to one of the many fast food or sit-down chain restaurants available within a ten minute drive of most neighborhoods; in "Rituals at McDonald's" Conrad P. Kottak (2000) points out that no matter where you choose to go, the experience is essentially the same. The food is the same, the words spoken, the actions taken, both by customers and employees, are virtually the same and performed in the same order. There is continuity through time and space, from day to day and in each location across the country or even the globe. Same prices, same environment, same

architecture, same toys and characters; no wonder Kottak (2000:159) calls visiting a McDonald's a "secular ritual."

And then there is industrial agriculture. One of the most tragic things about modern industrialized agriculture is how completely unaware the general public is of the social and environmental atrocities wrought daily on a global scale by such practices. The separation between people and their food mentioned earlier is part of what allows us to be blissfully unaware of the harm being caused; we have fallen into a state of existence Kimbrell (2002:xii) deems "unintentionally complicit."

B. Fast Food, Fast Times: A Wrinkle in the Old Paradigm

Our culture has embraced speed along with same-ness. Time is a major consideration in our eating habits. "Domestic eating" has become the weekend or special occasion activity; household cooks rely more and more on convenience/pre-made meals (Brewis and Jack 2005). Studies show the speed factor is important to consumers; 35.5% of money spent on food in homes where both parents work was spent on fast food in 1999 (Brewis and Jack 2005:52-53). McDonald's actually tried improving its food quality with 1998's Made For You menu that was made when the customer ordered. The following financial quarters showed profits to be slipping due to customer impatience with the added couple minutes' wait, after which McDonalds dropped Made For You and returned to prioritizing speed (Brewis and Jack 2005:53). Our cultural obsession with speed -- with "time poverty" -- can be seen not just as a function of the structure of work and labor hours in the West, but also a result of a transformation in the way we have been

conditioned to view time (Brewis and Jack 2005:55). Time is a social construction in all cultures; In the West, as we know, time is linear, tangible. It can be "saved, spent, wasted, lost, made up, accelerated, slowed down, crawling and running out" (Brewis and Jack 2005:55, quoted from Hall 1976:19). Today, time is a threat. Just like our food, it is no longer organic or natural. It gives some perspective to understand that fast food was born in southern California, a community unique for its dependence on the automobile, which allowed fast food to be popular and seemingly necessary. "Restlessness, impermanence, and speed were embedded in the culture that soon emerged there" (Schlosser 2002:16).

C. Diseases of Affluence and You: What Every Omnivore Should Know

The health consequences of our food culture have been grave. In *Undernutrition, Overnutrition, and Hunger in Lands of Plenty*, Goodman, Dufour and Pelto (2000:333), bring up the important fact that "culture and ideology play roles in determining who may be at risk" for the so called "diseases of affluence", and this is well evidenced in our own culture. Hand in hand with decreased variety has come the increase of processed foods high in fat, salt, sugar, and flavorings. Results from the 2003-2004 National Health and Nutrition Examination Survey (NHANES), using measured heights and weights, indicate that an estimated 66 percent of U.S. adults are either overweight or obese (http://www.cdc.gov/nchs/2006). Between 1980 and 1999 the prevalence of overweight persons in the United States nearly tripled (from 5% to 14%) among adolescents and nearly doubled (from 7% to 13%) among children 6 to 11 years of age. This trend

forecasts an increase in chronic disease as the younger generation ages. "Little is known about effective ways to reverse this alarming trend, although its root cause of insufficient physical activity in relation to excess calories consumed is well known" (http://www.cdc.gov/nchs/2006). According to the Centers for Disease Control and Prevention, the Journal of the American Medical Association found 58 million adults at risk for health problems because of their weight. Teenagers had risen from 15% overweight in the 70's to 21% in the late 90's (Cavallini 2001:26-27). As of 2005, childhood obesity in the United States was growing at a rate of 20% a year. Obesity in the U.S. is responsible for 300,000 deaths and $100 billion in medical costs annually, according to the American Obesity Association (Goodall 2005:241).

Eaton and Konner (2000:62) assert that longer life expectancy cannot bear the sole blame for nutritional diseases; Western youth now commonly have "asymptomatic forms", the most obvious cases being with diabetes and obesity. Diets dominated by processed foods and snack foods are also low in nutrient density (ratio of micronutrients to calories), promoting deficiencies in iron, calcium, and other nutrients and consequent problems in learning, resistance to disease, and other functional domains. Paradoxically, many of those people who have problems with the opposite end of the spectrum – obesity – still experience nutrient deficiency. They are consuming more energy than they expend, but the foods themselves are still void of good nutrition. Thus they are getting "the worst of both worlds" (Goodman, Dufour, Pelto 2000:333).

D. Our Children's Plight

Younger people need more nutrient-dense diets, yet are most vulnerable to "quick satisfaction" and advertising (Goodman, Dufour, Pelto 2000:333). Unfortunately, children are the demographic most vulnerable to the ever present marketing of our culture's current food and consumption mentality. According to Kelly Brownell, psychologist and manager of the Center of Eating and Weight Disorders at Yale University, obesity is a direct result of the American fast-food culture and particularly the heavy presence of food advertising on TV. The typical American child spends twenty-one hours a week watching television; that equals one and a half months of TV a year, and 30,000 commercials. About a quarter of American children under the age of five have a TV in their room (Schlosser 2002:46), and Brownell claims the average child watches ten thousand food ads a year, for "unhealthy foods being eaten by thin people" (Cavallini 2001:26-27).

Not surprisingly, children are often viewed by advertising agencies as the most important demographic, and for good reason, as they are so impressionable. Children, of course, also bring along the purchases of their parents with them. "Hoping that nostalgic childhood memories of a brand will lead to a lifetime of purchases, companies now plan 'cradle-to-grave' advertising strategies." "Indeed, market research has found that children often recognize a brand logo before they can recognize their own name" (Schlosser 2002:43). Advertisers will do seemingly anything to decipher what children want. They will conduct "focus groups" for children, analyze their artwork, hire cultural anthropologists to observe them in public places, even study their dreams (Schlosser 2002:44) in order to better design their television commercials, company mascots, as well

as the products themselves. Another tool used nowadays is the internet. Before a 1998 federal investigation, culminating in the Children's Online Privacy Protection Act of April 2000, 89% of websites aimed at children requested personal information, only 1% the permission of the parents to give it (Schlosser 2002:45). Schlosser (2002:45) reports the appalling fact that "A character on the McDonald's website told children that Ronald McDonald was 'the ultimate authority in everything.'" In light of this information it is no wonder that obesity has become such an epidemic among American children. In many communities fast food has become so pervasive that there is often hardly any other choice even if the youth did want to eat elsewhere (Ritzer 2003).

And as if this were not enough, fast food and soft drink companies now make a common practice of brokering deals with school districts struggling beneath the burden of inadequate funding. In exchange for much needed monetary gains – sometimes in the millions of dollars – schools hand over lunch contracts allowing for that brand of fast food to be sold – sometimes exclusively – in the school cafeterias and vending machines. In many cases the companies are also allowed to advertise on school grounds and at school activities. Millions of children across the country have no choice but to make a lunch, five days a week, of either a greasy burger and pizza washed down with a sugary soft drink, or of the equally as unhealthy (and possibly dangerous) fare provided by the government.

Children are also being indoctrinated with poor eating habits from day one by their parents (who likely formed their own poor eating habits during childhood), in their own homes. As early as the second year of life, babies respond to so-called social cues (instead of what their body is telling them) of what and when to eat. This is also a time

when growth rate slows significantly. Parents have a tendency to satisfy picky toddlers with salty/sweet snacks, or at dinner time instead of serving what the rest of the family is having, serving them "kid foods" – quick and easy to prepare, tasty, but consequently usually unhealthy, such as pizza, chicken nuggets, and macaroni and cheese. According to the Feeding Infants and Toddlers Study by Mathematica Policy Research and Gerber Products Co., referred to in *Time* magazine's 2006 article "Rethinking First Foods", by age two one in five babies is eating candy daily; the No. 1 "vegetable" fed to them is french fries (Paul 2006:58-59). Every month 90% of American children between the ages of three and nine are taken to a McDonald's (Schlosser 2002:46). A taste for fat developed in childhood is difficult to lose as an adult. By the time they are adults, they are both accustomed to poor diet and don't feel the absence of healthier foods (Ritzer 2003).

E. Industrial Agriculture: A Dream Come True for Foodborne Pathogens

There are other, less immediately obvious ways that our current methods of growing and consuming food are having dire effects on our health. Our current systems of industrial agriculture – namely the meatpacking industry – combined with the homogenization and franchising of restaurant chains round the country and the globe, have created a perfect system for the spread of foodborne diseases. In the United States there are 9,000 deaths a year caused by food borne illnesses (Kimbrell 2002:12) and about 200,000 are sickened (Schlosser 2002:195). A Center for Disease Control and Prevention (CDC) report found that between 1970 and 1999, foodborne illnesses

increased more than tenfold in the United States (Kimbrell 2002:10). Eric Schlosser provides some frightening statistics: "A nationwide study published by the USDA in 1996 found that 7.5% of the ground beef samples taken at processing plants were contaminated with *Salmonella*, 11.7% with *Listeria monocytogenes*, 30% with *Staphylococcus aureus*, and 53.3% with *Clostridium perfringens*" (2002:197).

The main culprit, of course, is a virulent strain of the naturally occurring gastrointestinal bacteria *Escherichia coli*, or *E. coli* O157:H7, which is spread through contact with fecal matter of infected animals. That same 1996 USDA study found that 78.6% of the ground beef tested contained microbes spread primarily by fecal material (Schlosser 2002:197). The mode of operation in the nation's slaughterhouses is partly responsible for contamination of the meat. Basically, a combination of intense line speeds, which don't always allow for careful and accurate dismemberment, in conjunction with a general lack of sanitation and hygienic knowledge on the part of the overworked, often illiterate, often illegal workers leads to contaminated dirt, manure, blood, intestinal contents, un-sanitized utensils, etcetera, finding their way onto or into the meat. The workers themselves become infected and spread the diseases that way as well (Schlosser 2002).

Usually, the animals doomed for slaughter are already sick, dirty, and diseased before they ever climb the ramp into a slaughterhouse. The feedlots of what Kimbrell has deemed "animal factories" are incredibly unsanitary operations. Hundreds of acres may contain thousands of individual cattle. The cramped quarters allow them to become covered in dirt and their own manure, and to develop cattle-specific diseases. Until 1997, ¾ of American cattle were fed other animal remains -- other dead cattle, dead sheep, dead

pigs, dead horses, cats, dogs, other pets, this all including individuals that had been diseased, and even cattle blood. Dead cattle are also fed to poultry and other animals. "The waste products from poultry plants, including sawdust and old newspapers used as litter, are also being fed to cattle" (Schlosser 2002:202). Thus the pathogens are re-circulated.

Nowadays, school lunch is the lowest quality food the government or agribusinesses don't want to (or can't) sell to consumers, if not flat out fast food such as McDonald's, Domino's, or Taco Bell that has contracted with schools struggling with their budgets (Goodall 2005:223). In the 1980s and 1990s the USDA chose its school lunch ground beef suppliers on the basis of lowest price, which meant schools were getting the worst grade of meat possible. There are numerous cases of links between *E.coli* outbreaks in schools and their meat suppliers. Children have died from *E.coli* contracted from eating a school lunch. Generally the USDA continued to do business with the companies at fault. The USDA has continued to purchase meat from suppliers even after testing revealed a near 50% contamination with *Salmonella* (Schlosser 2002:219). *Salmonella* testing for the National School Lunch Program's meat supply was actually halted by the Bush administration. The testing had only been going on for ten months, and during that time five million pounds of meat intended for the nation's school lunches was rejected for contamination (Schlosser 2002:277).

F. Industrial Agriculture: My Dangerous Chemical Romance

Of course, it's not just meat products that contain possible threats to our health and the health of our nation's children within each bite. The centralization and standardization of the harvesting, production, and distribution of all types of agricultural products means the producers have been forced to invent means – i.e. artificial, chemical means – to make their unnatural, polluted, unripe, bland, sterile food appear colorful, tasty, clean, fragrant, ripe, and appetizing. The result is that the same factories and technologies that flavor your food flavor your detergent and toilet cleaner as well (Schlosser 2002:122).

The effects of long term consumption of these chemical color and flavor additives are not largely known, but there is some evidence that they can be detrimental. For example, "the enhanced red color of some non-organic strawberries comes from the fungicide captan, a probable human carcinogen that irritates skin and eyes," "phosphoric acid in fizzy drinks has been linked to osteoporosis. Aspartame, an artificial sweetener...is linked to mood swings and migraines, and monosodium glutamate is linked to asthma and headaches" (Goodall 2005:172). It is not exactly reassuring to know that the FDA does not require manufacturers to make their ingredients public, "so long as all the chemicals are considered by the agency to be GRAS (Generally Regarded As Safe)" (Schlosser 2002:125), a rather arbitrary label that hardly inspires confidence in a consumer.

G. Industrial Agriculture to World Hunger: Panacea or Poison?

The most important – and the most ironic – thing to realize about industrial agriculture is that it is actually increasing world hunger, not alleviating it. How is this possible? It does so, in short, by "raising the cost of farming, by forcing tens of millions of farmers off the land, and by growing primarily high-profit export and luxury crops" (Kimbrell 2002:6). Vandana Shiva (2003:125) characterizes industrial agriculture as "economic warfare against the poor." She contends that worldwide hunger has grown in direct proportion to the spread of industrialized agriculture. Industrial agriculture essentially forces poor farmers to migrate from rural to urban areas as their land is acquired for the production of export crops. Now these landless poor, who previously could easily feed themselves, must work low-paying jobs in cities in order to purchase less food than they could grow themselves in the first place (Kimbrell 2002:7-8).

In truth, relying on a massive industrialized system reliant on chemicals, technology, and a monoculture farming strategy (the practice of planting only one species of crop in a given area) to produce our food is robbing every single person on the planet. It is a commonly held assumption that despite its numerous failings and obvious problems, industrial agriculture is still worth it because it is the only way to produce enough food to feed a growing worldwide population, expected to hit 10 billion by 2030, which already includes 800 million who go hungry each day (Kimbrell 2002:6). Studies, like one referred to by the National Research Council in 1989, have found that small, sustainable, "alternative" farming systems are actually more efficient than industrial agriculture, both because they expend less money on chemicals and machinery, and in most cases produce more crops per acre than industrial farms (Kimbrell 2002:20).

This may seem at first an astonishing revelation, but can be explained by examining how "yield" is traditionally measured. Normally, yield is quantified by how much of one crop per acre is produced. With monocropping (another term for monoculture) you will have the highest "yields" this way. But smaller farms that "intercrop" plant many more types of crops, leave less soil unused as "weed spaces", and also incorporate livestock which do the job of fertilizing the soil. The resulting "yield" of all foods from small farms per acre is almost always higher (two to ten times higher) (Kimbrell 2002:21-22). "Biodiversity–based measures of productivity show that small farmers can feed the world" (Shiva 2003:135).

Amazingly, even under our current system we have enough food to feed every person on the planet 3,500 calories worth a day. During the last 35 years per capita food production worldwide has grown 16% faster than the world's population (Kimbrell 2002:7). So why are 800 million people still going hungry? The problem is that the food isn't being distributed equally. Much food simply goes uneaten and rots in storage (Shiva 2003). Those landless poor mentioned earlier who are forced to abandon their land and work in cities, or become "serfs" to their corporate lords, are no longer growing their own food, yet cannot afford to buy the food being grown under their very noses. In other words, they have lost the "food entitlement" they once possessed on their own farms. Nobel-Prize winning economist Amartya Sen proved it was not lack of food but lack of food "entitlement" that caused starvation deaths around the world in the 1940s (Shiva 2003:126). In addition, much of the land appropriated by corporations for industrial enterprises isn't used to produce staple foods that can feed the hungry, but instead for high-wealth cash crops intended for export, such as sugar cane, cotton, and

This may seem at first an astonishing revelation, but can be explained by examining how "yield" is traditionally measured. Normally, yield is quantified by how much of one crop per acre is produced. With monocropping (another term for monoculture) you will have the highest "yields" this way. But smaller farms that "intercrop" plant many more types of crops, leave less soil unused as "weed spaces", and also incorporate livestock which do the job of fertilizing the soil. The resulting "yield" of all foods from small farms per acre is almost always higher (two to ten times higher) (Kimbrell 2002:21-22). "Biodiversity–based measures of productivity show that small farmers can feed the world" (Shiva 2003:135).

Amazingly, even under our current system we have enough food to feed every person on the planet 3,500 calories worth a day. During the last 35 years per capita food production worldwide has grown 16% faster than the world's population (Kimbrell 2002:7). So why are 800 million people still going hungry? The problem is that the food isn't being distributed equally. Much food simply goes uneaten and rots in storage (Shiva 2003). Those landless poor mentioned earlier who are forced to abandon their land and work in cities, or become "serfs" to their corporate lords, are no longer growing their own food, yet cannot afford to buy the food being grown under their very noses. In other words, they have lost the "food entitlement" they once possessed on their own farms. Nobel-Prize winning economist Amartya Sen proved it was not lack of food but lack of food "entitlement" that caused starvation deaths around the world in the 1940s (Shiva 2003:126). In addition, much of the land appropriated by corporations for industrial enterprises isn't used to produce staple foods that can feed the hungry, but instead for high-wealth cash crops intended for export, such as sugar cane, cotton, and

flowers (Kimbrell 2002:15). The conclusion is that it does not matter how much food an industrial system is producing; if the poor and hungry can't purchase it, such a system can never "feed the world."

H. Industrial Agriculture: Serfdom in the 21st Century

But what of those who choose to remain on their land? They fall under control of the corporations they must contract with. "On-farm decisions" such as how much and what type of seed or fertilizer to use are now made by the corporations, not the farmers, with no concern for long-term viability of the farm. Competitive pricing is the only goal (Kirschenmann 2003:104). Of course, retail firms prefer business with larger farms to reduce transaction costs, contributing to what forces these small farmers out of business (Kirschenmann 2003:104-5). Under an industrial system, the expensive seeds, chemicals, and machinery needed to maintain such a system are now only available to the farmers by borrowing from the same agents who sell the seeds and chemicals, thus trapping the already poor farmers into debt. They must then sell back all they produce in order to pay back this debt, leaving little for their families to survive on (Shiva 2003:125-126). Several commentators echo each other in their characterizations of this phenomenon of corporate control. Vandana Shiva denounces such "corporate feudalism" (2003:125); Frederick Kirschenmann recalls *Time* magazine's 1992 description of these "serfs on their own land" (2003:105). Discussing poultry farmers of the American South, Eric Schlosser believes they have been reduced to "little more than serfs" (2002:139).

This last quote raises a very important point. The problems discussed above are not simply confined to the third world, as many Americans are likely to believe. We are experiencing the exact same issues right here in the United States. The industrialization of livestock raising, farming, and meat packing has helped to create "rural ghettos" throughout the country (Schlosser 2002:149). It is generally known nowadays that the number of private owned and family farms decreases every year as they are bought out or competed out by big business agriculture. The farms are bought by the corporations, then the farmers who had been driven off the land are then hired to manage them (Schlosser 2002). "When there is a dearth of local farms, rural communities tend to die off or struggle to survive" (Goodall 2005:187).

Pressure to keep up with the demands of fast food chains has been a major motivation to increase yields and efficiency in, for example, potato farming. But the profits are only seen by the few who control the market, not the many who actually grow the potatoes. The current market for potatoes is an "oligopsony" – a market in which a small number of buyers exerts power over a large number of sellers (Schlosser 2002: 117). Though American farmers have responded by increasing their productivity, this increase has actually lowered the offers they receive from big processing companies. "Out of every $1.50 spent on a large order of fries at a fast food restaurant, perhaps 2 cents goes to the farmer who grew the potatoes" (Schlosser 2002:117). Schlosser quotes William Heffernan, professor of rural sociology at University of Missouri, for his use of the analogy of an hourglass to represent America's agricultural economy. "At the top there are about two million ranchers and farmers; at the bottom there are 275 million consumers; and at the narrow portion in the middle, there are a dozen or so multinational

corporations earning a profit from every transaction" (2002:119). Yet these farmers must continually strive for higher yields or face complete ruin.

I. Industrial Agriculture's Social Consequences

Sadly, the pressures of our modern industrial system of agriculture being placed on farmers in the United States and abroad are permanently damaging to the individual and collective psyche. Jane Goodall (2005:39) suggests these pressures may be part of the underlying reason for rise in farmer suicides since 1998 in the U.S. and Britain, claiming they are now twice as likely to commit suicide as other members of the population, while others contend the suicide rate among American farmers and ranchers is three times higher than the national average (Schlosser 2002:146). In recent decades "massive farmer suicides" have been on the rise around the globe (Kimbrell 2002: 8). Over 20,000 farmer suicides have occurred in India since the country's agricultural sector went global. There are even records of Indian farmers selling their own kidneys to clear their debts (Shiva 2003:125).

It is not only farmers, however, who are suffering because of industrial agriculture. Society as a whole can be affected as well. The "farm crisis" of the 1980s in India incited violent nationalism among angry Sikh youth who had been driven to unemployment. Parallels can be found in recent American events. Shiva links the Oklahoma City bombings to "a national farm crisis, as evident in the growing dispossession and frustration of American family farmers who increasingly turned to a gospel of violence and hatred being promoted by Christian militias" (2003:123).

J. Industrial Agriculture and Crimes Against Nature: Guilty As Charged

Indeed, rather than helping to sustain life on this planet, industrial agriculture is systematically decimating biodiversity and the health of ecosystems the world over. Kimbrell (2002:28) labels industrial agriculture as "the largest single threat to the Earth's biodiversity." Industrial agriculture relies heavily on the use of chemical fertilizers, pesticides, and herbicides. Because of monocropping, the soil becomes so depleted of nutrients that "the farm's entire ecosystem is on chemical life support" (Goodall 2005:39).

In one of many vicious cycles to be found lurking beneath the surface of industrial agriculture, pesticide use only encourages even more powerful pesticide use, as the insects it is intended to kill develop resistances. More than fifty scientific studies have documented the adverse environmental effects of pesticide use on bird, mammal, and amphibian populations in North America (Kimbrell 2002:29). Kimbrell cites a Professor David Pimentel who estimated 67 million birds die each year from pesticide exposure. This figure is repeated by Jane Goodall in Harvest for Hope (2005:41). Birds actually suffer twice over when pesticides indiscriminately eliminate the diversity of insects that their diets depend on (Kimbrell 2002:30). In 1984, half of all fish kills in South Carolina were attributed to pesticide contamination (2002:30). These chemicals weaken the immune systems of dolphins and whales, destroy honey bees' ability to produce honey, and cause birth defects in amphibians. "When orcas are washed up on the shores of British Columbia their bodies are so contaminated with PCBs [polychlorinated biphenyls,

a known toxin and possible carcinogen] that they are regarded as hazardous toxic waste. And their calves die from drinking their mothers' toxic milk" (Goodall 2005:41-42).

Indeed, by its use of these chemicals, industrial agriculture can easily be seen as a "war against ecosystems" (Shiva 2003:122). The discovery of many chemical insecticides was made during World War II, when it was observed that nerve gasses intended for the enemy killed insects as well (Goodall 2005:40). Many of these chemicals were originally developed for use in chemical warfare, and their aggressive nature is significantly preserved in their names, such as these herbicides: "Machete", "Lasso", "Pentagon", "Roundup" and "Avenge" (Shiva 2003:123).

Chemical fertilizers are equally destructive, if not worse. They leach into groundwater and contaminate the soil, potentially coming into contact with every living thing that depends on water and soil for life. There is an ever-growing need for yet more of these fertilizers because mono-cropping and the use of large machines for planting and harvesting stimulate massive topsoil erosion (Kimbrell 2002). This leaves the farmland devoid of nutrients and in turn it must be chemically fertilized in order to enable arability, thereby continuing the cycle of erosion and pollution. The fertilizers will also eventually find their way through the water cycle to aquatic environments (which humans depend on for food as well), which are especially vulnerable to toxic pollution. For example, the Chesapeake Bay populations of native sea grasses, fish, and shellfish have declined dramatically thanks to contamination by runoff from industrial farms (Kimbrell 2002:30). In fact, 40% of the Chesapeake Bay, formerly an incredibly rich and ecologically significant estuary, is now considered a "dead zone" due to agricultural and factory farm

toxic runoff. And in the Gulf of Mexico, at the mouth the great Mississippi River, is a dead zone the size of Israel (Goodall 2005:90).

In addition to this, the huge feedlots that supply the United States' slaughterhouses also produce 1.3 billion tons of chemical and hormone-laden manure each year that must be disposed of. Kimbrell reports "fish kills in tens of millions" as a result of water contamination with feedlot waste (2002:16). The amount of animal waste produced in factory farms is a staggering 130 times greater than the amount of human waste in the United States, and unlike human waste, it is never treated (Goodall 2005:89). Such vast waste production exacts huge costs to the taxpayers who must eventually finance its clean-up.

Industrial agriculture attacks the diversity of life through more ways than simply poisoning the air, water, and soil. Mono-cropping is also an efficient method for destroying biodiversity. Within the farm itself, mono-cropped fields are obviously less diverse than poly-cropped, as only one species of plant is being grown instead of many. Additional biodiversity is diminished due to habitat destruction as industrial agriculture acquires more land to reach the same level of output of the sustainable agriculture it has likely displaced (Shiva 2003).

Monocropping is dangerous because it is essentially "putting all your eggs in one basket". Variation is what allows crop species to survive in times of disease. So, when agribusiness overtakes small farms and eliminates species diversity among crops, "an outbreak of disease can suddenly attack billions of plants" (Goodall 2005:39). A U.S.

National Academy of Sciences statement reads, "America's principal crops are impressively uniform, and impressively vulnerable" (Goodall 2005:40).

Consider this story related by Jane Goodall in Harvest for Hope (2005:39-40):

"In 1970 almost all the rice crop in Asia was threatened by a virus. This meant that the good supply of hundreds of millions of people was at risk. Scientists searched desperately through gene banks of 47,000 varieties of rice hoping to find one that could resist this particular disease. Eventually they found one – just one – growing in a valley in India. So that time the disaster was averted. It is sobering to learn that shortly thereafter that particular valley was flooded for a hydroelectric project. Suppose that had happened before finding the resistant plant..."

Industrial agriculture even contributes to global warming. The long-distance transport of goods inherent to the system results in thousands more vehicles unnecessarily burning massive amounts of fossil fuels (Kimbrell 2002), increasing CO2 levels in the air. For example, Hawaiian-grown sugar cane is shipped to be refined in California, packaged in New York, and flown back to Hawaii to be served in a coffee shop there, concluding its 10,000 mile round trip (Goodall 2005:158). Food products within U.S. borders alone travel 566 billion ton-miles annually. The need for additional machine labor also consumes fossil fuels. Overall, industrial agriculture uses about 30% more fossil fuel than organic agriculture (Goodall 2005:161).

K. Industrial Agriculture and Mother Nature's Prodigal Sons and Daughters

As part of the Earth's ecosystem (whether they like it or not), humans, too, are also at risk to the adverse effects of these chemicals. The Food and Drug Administration reports at least fifty-three pesticides classified as carcinogenic are currently applied to our major food crops (Kimbrell 2002: 10). Only an estimated .1 % of pesticides reach the

target pests. The rest goes to non-pests, groundwater, rain, the air we breathe, and leaches into the lakes, rivers, and oceans (Goodall 2005:41). The Environmental Protection Agency reported that more than one million Americans drink water laced with pesticide runoff from industrial agriculture (Kimbrell 2002:11). "Many U.S. products have tested as being more toxic than those from other countries" (Kimbrell 2002: 11). "The average daily intake of dioxins in the U.S. in 1999 was more than 200 times higher than the Environmental Protection Agency's cancer risk guideline" (Goodall 2005:144).

To make matters worse, current standards do not include specifics for those most vulnerable to the harm effects of toxic chemicals: fetuses, infants, and children. Many scientists link pesticides to the current "cancer epidemic" in children. A National Cancer Institute study found farmers working with industrial herbicides six times more likely to develop non-Hodgkin's lymphoma (Kimbrell 2002:11). Other related health problems include permanent brain, nervous, and reproductive system damage due to exposure to toxic chemicals such as PCBs and organophospate insecticides during developmental periods (Kimbrell 2002:11). More sobering is the knowledge that dioxin exposure in the womb has been associated with birth defects, IQ deficits, attention deficit disorder, hyperactivity, and childhood depression, and the 2004 Mercury Hair Sampling Project by Greenpeace found 1/5 of women of childbearing age had mercury levels in their bodies that exceeded the EPA's recommended limit (Goodall 2005:143).

In 1994 a study was conducted on groups of Mexican children living in two separate towns – one about sixty miles away in any direction from agricultural areas, the other in an agricultural valley where pesticides were used heavily. The towns were otherwise similar in their education, economy, and housing. Children who lived in the

agricultural valley were found to have difficulty with basic hand-eye coordination tasks, poorer memory skills and stamina, were more prone to aggression , and were less sociable and creative while playing (Goodall 2005:43)

It may even be worth it to consider, in today's current political climate, that a centralized, standardized agricultural system wherein millions of consumers are dependent on a few powerful corporations utilizing farming methods that are neither stable nor resilient is frighteningly vulnerable to a potential terrorist attack. Because we no longer depend on local farms and economies for the bulk of our food, such an attack would be overwhelmingly devastating and effective towards the terrorists' goals.

L. Summary

The crucial, underlying thread beneath this endless web of desperately important facts is summed up quite nicely by Frederick Kirschenmann: "Farms are micro-ecosystems that exist with macro-ecosystems. As such, agriculture is an inevitable part of the larger dance of life – part of that complex, interdependent web of life that has evolved over four billion years. We ignore that evolving complexity only at our peril" (2003:107).

The complexity of the environmental problems described above is compounded with a problematic culture obsessed with speed, convenience, and homogeneity which leads people into unhealthy lifestyles here in America. Meanwhile, people continue to unknowingly support a system which is serving only to exacerbate the global problems of hunger and economic instability. The only truly effective and permanent solution must

come from within the culture itself. The next chapter illustrates how such a solution can be more than simply a possibility – it can be a reality.

CHAPTER TWO

FROM SLOW FOOD TO SCHOOL GARDENS: A LIGHT AT THE END OF THE TUNNEL

The solutions to the problems with our current food system outlined in Chapter One are complex and will likely be difficult to achieve, but they do exist. There are many possible paths to follow. One such path has struck me as having particular potential to help right the wrongs of our modern food system in a meaningful and enduring way. This is because it holds the potential to help, gradually, to modify our "fast-food" culture into a culture with a more responsible, sustainable, and realistic attitude toward food.

The Slow Food movement, which is both an organization and a philosophy, embodies ideals and principles which run counter to the current American attitudes toward both food and life. Slow Food emphasizes literally "slowing down" at every step of the process of growing, cooking, and eating food. This begins with livestock and crops grown on organic farms utilizing sustainable farming systems. Slow Food encourages its members to support farmers' markets and buy locally, and to enjoy the experience of cooking fresh meals at home. A person living the Slow lifestyle attempts to avoid highly processed foods or foods whose origin is not local or regional, including but not limited to such products as fast food or frozen dinners from the supermarket. Standardization and homogeneity are to be shunned, while diversity, regionality, and

authenticity are to be embraced. Slow Food calls for farming practices which are simultaneously sustainable in the environment and profitable to the local economy. In short, the Slow Food philosophy has the goal of a healthier state of being for mind, body, economy, and Earth. To quote Carlo Petrini in *The Case for Taste* (2001: xii), "here at the table lies the template for the preservation of human rights and the environment."

A. Slow Food: A History

Carlo Petrini is the founding father of the official Slow Food movement. While Petrini obviously did not invent the idea of eating regional, natural foods for one's pleasure or health, or maintaining the land with conscience and common sense, he was the first to solidify these ideas and values into a concrete organization complete with a creed, loyal members, conferences, magazines, books, a website, and a plethora of other perks and benefits. As a result of devoting his life to the Slow Food cause, he has gained a reputation as one of the most venerable and respected advocates of the movement, and figures importantly in its history and development.

Petrini was born in Bra, a town in rural Italy, in 1949. He was raised in an environment where the community clung to regional traditions, both agricultural and culinary, which naturally shaped his perspectives on food and eating. He majored in sociology at college, and in 1975 founded Radio Bra Red Waves, a left-wing independent radio station which was the second station to break the state monopoly on the airwaves.

Petrini continued his leftist activism into the 1980s. He saw himself as part of a

people's movement linked with "the people's" culture. Of this time in his life he is quoted by Kummer in saying, "I came to understand that those who suffer for others do more damage to humanity than those who enjoy themselves. Pleasure is a way of being at one with yourself and others" (Kummer 2002:18). According to Kummer, his leftist ideology helped him understand how to sell a seemingly "bourgeois" and "decadent" idea (Socialism) to the essential blue-collar tier to which it was intended. This newfound ability would prove infinitely useful in the marketing of his next "bourgeois" passion, Slow Food. On his radio broadcasts, Petrini focused on a goal of education. Combining food with philosophy, history, sociology, anthropology was a new concept at the time, but the broadcast nevertheless drew many listeners.

In 1986 Petrini and his friends formed Arcigola, an early prototype of Slow Food International, with Petrini as the president-elect (Kummer 2002:20). Eventually he opened a restaurant in Bra, the *Osteria del Boccondivino*. At this time the national gourmet society was a right-leaning "gentlemen's club" in Petrini's eyes. The *Osteria* had a definite goal to combat that society's elitist tendencies and fancy food. All were welcome at the *Osteria*, including women and the poor. The story of the *Osteria* is useful in countering arguments that Slow Food is too deeply rooted in the elitist stratosphere. (Kummer 2002:18-19).

The "decisive moment" for the creation of Slow Food came in 1989, when McDonald's announced its plans for a new restaurant at the base of the Piazza di Spagna in Rome, inciting protests throughout Italy across the political spectrum. It was at this time that Arcigola realized that protests and "guerilla warfare" were not going to carry

very far in this David-and-Goliath battle. The need for a long-term strategy to counter the "flood of homogenization" and to preserve the values of regionality and authenticity, for which Arcigola already stood, was now recognized as imperative. Now with McDonald's and other fast food there was also a clear enemy, which always helps to solidify movements and bring people together. It was felt that this new, broader movement would need a name, and thus Slow Food was born (Kummer 2002:20-22).

Soon countries from around the world began to interest themselves in the movement. A meeting was held in Paris in December 1989 at which delegates from fifteen countries ratified the Slow Food manifesto. The snail was chosen as the symbol of the movement, for obvious reasons. Thus Slow Food had essentially become the form it is known by today (Kummer 2002).

With its newfound international status and influence came new initiatives to help further its goals. The Ark, conceived in 1996, is a directory of foods from around the world. Members of *convivia* (local chapters that seek out those foods they feel define their regional character and then help to encourage/maintain them and their producers) nominate a local food for inclusion in the Ark. The food must be "of exceptional quality and flavor", local raw materials, made through traditional methods, and needs some sort of historical, environmental, or socio-economical bond with its homeland. And, the food must be in actual danger of extinction.

To help support the Ark, there is the Praesidium ("fort" "garrison"). It stands to help make the publicity resources of Slow Food available. The Praesidium works on the local, state, and national levels with bureaus and intergovernmental groups to help

support local farmers and small businesses to succeed, and also to encourage the adoption of Ark foods in order to continue their preservation (Kummer 2002:20-26).

Today there are about 80,000 official members of Slow Food in forty-five different countries (Kummer 2002:26). The U.S. currently has the largest amount of growth. At the 2000 Salone del Gusto (Hall of Taste) Slow Food convention in Turin, Italy, the United States was represented by one hundred food/beverage stands, eleven seminars on American foods, two Taste America dinners, and American embassy sponsorship (Petrini 2001).

B. Slow Food: A New Paradigm Smoothes Things Out

So how exactly can adopting a Slow Food lifestyle help alleviate many of the food- and agriculture-related problems plaguing humanity in the United States and abroad? Kimbrell believes "the fight" should be beyond going up against one singular issue or another (such as pesticides, genetic engineering, etc); rather, an entire new paradigm is needed. Slow Food stands ready to become this new paradigm. "Our ultimate goals must include nothing less than altering the thinking and very habits of perception of the public and policy makers" (Kimbrell 2002:xiv).

Even if one only considers the personal health aspect it is undeniable that biological and social forces work together in shaping human food use and have an interrelated outcome: the health of the people. And so even if for only this reason, what and how we eat should be important to everyone (Pelto, Goodman, and Dufour 2000).

Slow Food is the social impetus which can help direct our biology – our health – in a new direction.

C. Eat Organic, Eat Local

There are many obvious health benefits of eating organically grown produce, grass-fed beef and other meats, and the like. Naturally, one would not be running the risk of consuming pesticides, growth hormones, antibiotics, and other such substances commonly used on livestock and plant crops today. The FDA says at least fifty-three pesticides classified as carcinogenic are currently applied to our major food crops, and the EPA has identified 165 as potentially carcinogenic (Kimbrell 2002:10-11). Widespread use of antibiotics in livestock in an attempt to keep them healthy despite the unsanitary living conditions is leading to accelerating antibiotic resistances among pathogens in animals *and* humans, as these substances find their way into our systems through consumption of milk and meat (Kimbrell 2002). There is some evidence that such liberal use of antibiotics on cows has led to more resistant bacteria, "a factor in the deaths of more than 60,000 Americans each year" (Roosevelt 2006:78). Animal factory workers are already feeling the effects of increased resistance to antibiotics (Goodall 2005:88).

Irradiation of meat, dairy products, and processed foods, a process which destroys the DNA of the pathogens harbored within the food, is touted as one solution to the problem of foodborne illness (Schlosser 2002). However, "numerous reputable studies

have shown that consuming irradiated meat can cause DNA damage, resulting in abnormalities in laboratory animals and their offspring" (Kimbrell 2002:13). There are currently no government regulations or mandates requiring labeling on food that gives important information such as where it was grown, what chemicals were used on it, and whether or not it is genetically engineered or irradiated (in the case of processed food). American children have also become the "lab animals" of the world when it comes to the unstudied long-term effects of Genetically Modified Organisms (GMOs), also known as Genetically Engineered (GE) foods. Many countries have banned the use of such crops and are, according to Goodall (2005), watching American children for signs of long-term effects. The simplest way to be free of worry is to eat organic, locally grown produce and meat as much as possible.

Eating organically can have actively positive effects on one's health as well. Take, for example, the Taggart family's grass-fed ranch outlined in the *Time* article "The Grass-Fed Revolution" (Roosevelt 2006:76-78). The prairie on this Texas ranch is let to grow naturally. As a result of letting nature, a self-regulating system, take care of itself, the need for chemicals, irrigation, and herbicides is eliminated. The cattle are never sent to a feedlot; they grow to adulthood free ranging on natural prairie, are butchered locally, and sold nearby to customers in Fort Worth and Dallas for a premium price. Apparently these customers see something in this beef that makes it worth the extra money. In the meantime the Taggart family has doubled their income since their switch to grass-fed beef (Roosevelt 2006). Those who are purchasing the beef are now enjoying the benefits of meat with 65% lower saturated fat (i.e. the "bad" kind of fat) (Roosevelt 2006:76), which should be extremely relevant to anyone living in the nation with the world's

highest obesity and heart disease rates. Grass-fed beef is also *higher* in the "good fats", like omega-3 fatty acids, which actually reduce the risk of heart disease. In addition, "Ground beef and milk from grass-finished cattle also have more conjugated linoleic acid, which recent data suggest may help prevent breast cancer, diabetes and other ailments" (Roosevelt 2006:78). Finally, grass-fed cattle also have less resistant *E. coli* in their system and, since they are not being fed other dead cattle, cattle tallow, dead poultry, etc., have no chance of spreading mad cow disease (Roosevelt 2006).

This is but one example of the health benefits of eating fresh, organic, regional food – a practice central to Slow Food. "The Surgeon General has determined that two out of every three premature deaths is related to diet" (Kimbrell 2002:13). The overwhelming increases in obesity, Type II diabetes, high blood pressure, and heart disease among Americans are tied to dramatic increases in packaged, processed, fast and frozen foods consumption. There is much research tracing the roots of these so-called diseases of affluence to our evolutionary past. For example, in *Diet and Primate Evolution* anthropologist Katherine Milton (2000: 46-48) outlines the common suggestion that the diets of modern humans, especially in industrialized nations, bear little resemblance to the plant-based diets anthropoids have favored since their emergence on the world scene. This inevitably leads to the conclusion that modern health problems may be due in part to "a mismatch between the diets we now eat and those to which our bodies became adapted over millions of years," -- diets high in fruits, vegetables, and fiber, with low fat, salt, sugar, and meat. Out of five million years of hominid evolution, ten thousand have transpired since the invention of agriculture, and less than one hundred since the massive standardization and industrialization of agriculture and the rise of fast

food (Pelto, Goodman, and Dufour 2000). This is why, from a biological perspective, the Slow values of eating organic, local, seasonal foods cooked at home, which by default are low in sugar, salt, fat and, of course, completely free of additives, preservatives, and chemicals, are a much more natural and healthy way to eat than most Americans are currently doing. And, local food passes through fewer stages of handling, which greatly reduces its exposure to contaminants and its potential to spread disease.

D. Elitist, Expensive, and Inefficient: Debunking the Myths

One argument against a shift to a primarily organic, sustainable, multi-cropped agricultural economy is that without the highly mechanized, regulated system we use today – which involves using chemical fertilizers, pesticides, herbicides, and machine labor in order to harvest a maximum yield of one species of crop from a given plot of land – there will not be enough food for an ever-growing human population. Agribusiness has claimed that small farms would actually hurt wildlife by "wasting" land on low-yield cultivation and letting it be trampled by ranging livestock. However, the counterargument to this suggestion not only defends organic farming, but makes the urgency for adopting such a system all the more apparent. The fact is, smaller farms growing a diversity of crop species actually have higher yields than industrialized farms.

According to food policy expert Peter Rosset, this fact is now "widely recognized by agricultural economists across the political spectrum" (quoted in Kimbrell 2002:22). As explained in Chapter One, this is explained by how one measures "yield" – by how much of *one crop* per acre is produced, or by how much *total food* of all crops per acre is

been lost to most people. Knowledge, including knowledge of farming, is power, and that power is increasingly in the hands of a few faceless multi-national corporations.

This leads to another "cost" exacted on our freedom of choice. Massive distributors work with the agribusinesses to decrease variety and choice in our supermarkets and restaurants. Most products in supermarkets are the same few foods that are easiest to harvest and process, put in different looking packages. For example, a century ago there were "thousands of varieties" of apples grown in the United States, today 2 kinds account for more than 50% of the apple market. A Rural Advancement Foundation International study compared U.S. seed stocks in 1903 to those in 1983. The percentage decline in diversity were as follows: we have lost 93% of lettuce varieties in that time, 96% sweet corn, 95% tomato, and 98% asparagus varieties (Kimbrell 2002:24). "The U.N. Food and Agriculture Organization reports that 75% of genetic diversity in agriculture disappeared in this past century" (Kimbrell 2002:16).

Our unintentional complacency with our current food culture has also gained us some literal, economic costs as well. To start, there is the loss of farmers (five million in seventy years) and the related loss of business supported by farming communities. Taxpayers support costs of welfare and other government support to ex-farmers driven into poverty (Kimbrell 2002:17-18). Consumers pay billions in taxes for health care related to dietary diseases as well as cancer and other disabilities which have been linked to pesticides and other chemicals, as we saw in Chapter One. Timothy W. Jones, an anthropologist at the University of Arizona, did a ten-year study on family waste, and found that the nation throws away $43 billion in food waste alone each year (Goodall

2005:248). Toxic clean-ups and higher insurance premiums are yet more ways the burden is shouldered by the consumer who eats fast food every other day in the belief that it is saving them money. Moreover, billions of taxpayer dollars go to government subsidies of industrial agriculture each year. The government even pays for their promotion and advertising (Kimbrell 2002)!

It turns out that the Slow Food movement recognized from the start the "disturbing global split" that keeps cropping up and always threatens to hold Slow Food back from stellar international success; this of course being "the gulf" with "rich consumers who looked for good, genuine products cultivated by poor people – who only got poorer by continuing their traditional practices" on the one side, and "poor people constrained to buy bad food at cheap prices made possible by immensely potent industrial producers" on the other (Kummer 2002:22). In *The Case for Taste*, Carlo Petrini defends his organization by insisting Slow food is NOT gourmet food and wine society" and quotes the Slow Food Manifesto in explanation: "A firm defense of quiet material pleasures the only way to oppose the universal folly of the Fast Life" (Petrini 2001:xii).

And the truth is, organic and local does *not* always equal higher prices, even at face value. Often the opposite is true. Community Sponsored Agriculture (wherein consumers become shareholders in a farm and receive weekly fresh produce) and farmers markets usually offer produce at much cheaper prices than supermarkets. Just as importantly, "A study by the U.K.'s New Economics Foundation shows that...when you spend on local foods you generate twice as much income for your community as you would buying the same food from a supermarket" (Goodall 2005:184). It is revealing to discover that the mean income of a frequent organic food-buyer in the U.S. is $43,280,

and 31% of frequent organic buyers make under $15,000 a year (Goodall 2005:168). And, of course, the more people buy organic, the further prices will drop.

F. The School Garden Program as a Medium of Change

Most importantly, we should consider how all of these health and financial burdens are placed on the shoulders of our children daily when they are raised with poor eating habits and attitudes in the home, while being fed food of the lowest quality possible at school. Alice Waters, founder of the Edible Schoolyard in Berkeley, California, laments on how students are fed food at the lowest prices possible – "sold to the lowest bidder" which they eat often while surrounded by advertisements for corporations seeking to win them over mind and body. According to Waters this teaches children something about how the rest of the world views them, values them: "...more important as consumers than as students." Waters speaks of another "hidden curriculum" children are exposed to in the cafeteria. "These messages tell us that food is cheap and abundant. That abundance is permanent; that resources are infinite; that it's okay to waste; that standardization is more important than quality; and that speed is a virtue above all others" (www.edibleschoolyard.org).

But how can we begin to effectively teach Slow values and truly integrate them into society? I believe that gardening programs in schools are one vehicle through which these goals can be achieved. If food can be and is a medium of education, an "educational and revealing experience" as Waters believes, then a school garden is the

epitome of that idea. Most people are unaware that there was a time when, in the United States, school gardens were as ubiquitous as school computer labs and music auditoriums are in schools of today. They declined as agrarianism did, but recently there has been a resurgence of interest, and gardening programs have sprung up in many towns and cities around the country.

By now we understand what it as stake, but we are also aware that many people are working to make tomorrow's world a better place. They are doing so by adopting a "Slow Food" ideology of sustainable, regional, organic farming coupled with eating and purchasing practices that are responsible and conscionable toward their bodies and the environment. School gardening programs are an ideal way to educate future generations with these cultural values at a young age. The next chapter examines a few examples of how "natural" education in American schools is being revived.

CHAPTER THREE

THREE SCHOOL GARDEN PROGRAM CASE STUDIES

The following case studies examine three manifestations of the school gardening program concept. Case Study One describes one of the earliest – and most successful – school garden programs in the United States: The Edible Schoolyard in Berkeley, California. In this study we read first-hand accounts of how Martin Luther King, Jr. School's students have developed their academic and aesthetic senses. Also of note in this study is the commentary from a pioneer of such programs (and Edible Schoolyard Founder) Alice Waters. For the second study I have chose, rather than another specific school program, to investigate projects designed for school gardens everywhere. These exercises come from the National Gardening Association's Kids Gardening Project, an organization dedicated to providing resources and specifically tailored lessons to programs around the country. The final case study offers variety by looking at a garden program on the university level: The Yale Sustainable Food Project.

A. Case Study One: The Edible Schoolyard, Berkeley, California

The prototype of school gardening programs is "The Edible Schoolyard" at Martin Luther King, Jr. School in Berkeley, California. Its founder, Alice Waters, was inspired by the International Slow Food movement to create the program (Waters 2006).

King School, as it is known, is a public school with a socially and economically diverse student body of about one thousand 6^{th}-8^{th} graders. At one time, lunch here was "Microwaved, packaged food sold from a shack at the end of the parking lot" (Waters 2006).

King School's Edible Schoolyard consists of a one-acre organic garden and "kitchen-classroom". An ecologically designed cafeteria is also currently under construction and will further contribute to the project. The children's activities follow the basic formula of most school garden projects, with students being involved in every aspect of the process, from the tilling of the soil to care of the plants, harvest, preparation, and eating.

Creation of the garden was not an overnight process, but rather spanned many years and continues to change and develop. The 1994-1995 school year saw a design symposium and fundraising events. Teachers and students were involved from the beginning, tearing up the asphalt and debris on the selected plot and planting the first cover crop to prepare the soil. The year of 1995-1996 a cover crops of beans, clover, and oats was established to improve the soil conditions. Education of future staff at local gardens was underway, and sixth graders attended cooking lessons twice a month in their classrooms. By 1997 the project was comfortably settled in, with garden classes twice a week for students, and time in the kitchen classroom three times a month. Other structures to support the project were added, such as the pavilion for outdoor lessons, and tool shed. Fruit trees and other permanents crops were planted. By 1999 The Edible Schooyard and Alice Waters were receiving awards, donations, volunteers, and more sophisticated garden amenities and infrastructures. The garden now supported a very

wide variety of crops. By 2001 the goal of serving as a model for others had been reached, and The Edible Schoolyard began offering information, starter plant donations, and help to other schools wishing to start their own program. Finally, 2001-2002 saw new nutrition workshops after school, and the additional element of livestock, in the form of chickens, to the garden (www.edibleschooylard.org).

So what exactly goes on during a typical day in the Edible Schoolyard? Work in the garden or kitchen is always tied to a specific lesson. The hands-on gardening experience makes learning a pleasurable experience for the students. All the senses are involved, and learning is automatic. Lessons typically begin under a pavilion with a short introduction and themed questions for the students to keep in mind for the day ("Name a dormant plant" or "If you could make a recipe using something from the garden at home, what would you make?") (www.edibleschoolyard.org). Students join groups to help with various tasks designated by the garden manager as needed for that particular day.

Lessons are purposefully organized and structured. The staff realize the importance of a definitive opening and closing, clean-up, and provision of protective clothing. The students must learn to do the less glamorous jobs around the garden too, of course: the mulching, weeding, composting, etcetera. Students learn how to use the tools properly and wear practical clothing. Clean-up, responsibility, and organization are also strongly emphasized. The end of class always involves cleaning and properly storing the tools and equipment. Class closes back under the pavilion with a review of what was learned, a discussion by students, and a "closing circle" (www.edibleschoolyard.org).

The garden lessons also involve the classroom teachers, not just garden teachers, because the founders wanted the garden experience to be connected to the rest of the students' education, rather than seen by the students as a separate activity. Science classes often visit the garden, which provides an ideal supplement to many classroom lessons. Including teachers in the garden and kitchen lessons also allows more informal student-teacher interaction; this "provides a new dimension" to the students' relationship with school, while simultaneously allowing teachers to better know and understand their students. Overall the connection between student, teacher, classroom, and garden creates a sense of community and connectedness which can be taken back to the formal classroom.

In addition to the emphasis on responsibility and organization, Waters points out that a "concept of respect" is the primary philosophy utilized when introducing 6th graders to the garden for the first time. Instead of telling them what not to do (stepping on beds, throwing tools), the garden manager discusses the concept of respect and how it might translate to the garden. The Edible Schoolyard's official website (www.edibleschoolyard.org) provides numerous quotes from students detailing what they've learned, how they felt upon discovering the garden, and some of their own observations:

"When we got to the garden on the first day, I was amazed by all of the things that I saw," Kent - 6th Grade;

"I was impressed when I heard that kids before me built the garden," Angel - 6th grade;

"The garden looks beautiful, it smells great, it tastes like heaven, the sounds are very calming, and the feel of the plants is wonderful." Emily - 6th grade.

Just a fraction of what the students grow in the garden seasonally includes such variety as asparagus, beans, onions, parsnip, chard, carrots, pumpkins, tomatoes, gooseberries, broccoli, endive, lettuce, radish, artichoke, fava beans, garlic, strawberries, medicinal herbs, and flowers too. Students are encouraged to "forage" during class, and oftentimes tastings are held after class. Activities like making a Mexican candy called *alegria* from amaranth, brewing lemon verbena teas, roasting corn, making salads, and cooking veggie pizzas all do their part to add an element of fun to the program.

Part of what makes the Edible Schoolyard so effective on students is, according to Alice Waters, the "experiential, value-oriented approaches to learning based on participation," and in Waters' view that participation is key. "The Edible Schoolyard, for instance, has shown that if you offer children a new dish, there's no better than a fifty-fifty chance they will choose it. But if they've been introduced to the dish ahead of time, and if they have helped prepare it, they will all want to try it." The implications here for encouraging healthy eating and appreciation of fresh fruits and vegetables are obvious. Waters also believes that the participatory aspect is a "way of putting beauty and meaning into their lives" (Waters 2006). In fact, Waters believes the values of Slow Food are easily integrated into ***all*** levels of education, be it an actual hands-on program with gardens and kitchens, or more traditional academic inquiry. "Concentration and judgment and all the other Slow Food values that testing cannot measure would be given a chance to flourish" (Waters 2006).

We can see some examples of how the Edible Schoolyard has nurtured King School's students' aesthetic sense in quotes taken from their "Garden Journals". Each student picks their own "special spot" and is given time to sit there (no interaction with others allowed) and write in their journal. There is no work here, simply observation and reflection. Some prompts for the journals were: "Describe your special spot using as many of your senses as you can"; "A drawing of something in your spot"; "At least five things you have noticed that have changed in your special spot since last time" (www.edibleschoolyard.org). Here are some of the King's School students' responses: "I like being in my special spot: the bees, the spiders, the ants, the rolly-pollies, the huge leaves, the bugs, the smell, the sound, the sky, the birds, the clouds, the yellow leaves..."; "The leaves rustle with hidden secrets that even the laziest man would be dying to know. And the bees, gracefully floating from flower to flower, sing of flowers and gnomes and fairies who never seem to show themselves to anything but the bees, the birds, and the trees"; "I see beautiful white flowers, really big leaves, and figs. I wonder, when are figs ready to eat?"; "I see snails and slugs on a raspberry that fell on the ground" (www.edibleschoolyard.org).

Through these journal entries it is easy to see how the garden is developing the students' awareness of nature and their aesthetic sense. Through this garden program, even their artistic and creative writing abilities are being encouraged. They are exercising their brains in a positive way.

B. Case Study Two: Kids Gardening (National Gardening Association)

Kidsgardening.org gives a better idea of what, specifically, a child might learn in a school garden about ecology, conservation, and the environment.

The National Gardening Association (NGA), whose five-fold mission is one of "health and wellness, community development, home gardening, plant-based education, and environmental stewardship", is the parent organization of Kids Gardening (http://assoc.garden.org/about). Kids Gardening (www.kidsgardening.com) is not one specific program, but rather an extensive organization whose purpose is to provide grants, resources, lesson plans and ideas to gardening programs around the country.

Kids Gardening maintains a website which provides, among many services, comprehensive lesson plans and projects which anyone in charge of a school garden can utilize or adapt to their own needs. Many of these projects are especially good for instruction and hands-on learning concerning important scientific and ecological concepts that children need if they are to grow to responsible adults who are conscientious about the environment.

Let me illustrate this by describing the Kids Gardening project "Building Soil Nature's Way: Exploring Decomposition and Soil Health." This project teaches understanding and appreciation for the natural process of decomposition, which is an essential element of many cycles in nature. This project also conveys an appreciation for the usually unglamorous insects, worms, fungi, and microbes who cause the decomposition, and thus are an essential part of ecosystems. This decomposition project teaches kids exactly *why* they make compost in their gardens. The children are made to appreciate that it can take millennia for the microbes in the soil to make a single inch of

topsoil, which is why preventing the erosion and pollution of the good topsoil we already have is so crucial. As the website reads, this particular lesson shows kids that "nature exhibits no waste, and that's a good lesson for all of us" (www.kidsgardening.com 2004).

The site then outlines materials and instructions for building a "lasagna garden" – essentially a student-run garden which amply demonstrates the role of composting and mulching in controlling weeds and promoting plant growth. Again we see how the interactive, physical experience within the garden complements and aids the absorption of vital information imparted in more traditional lectures. The project's webpage also offers links to "curriculum connections" which consists of yet more supplementary material or advice for getting the most out of the project. For example, "Sparking Curiosity about Decomposition" offers suggestions for introducing the concept of decomposition to students for the first time, such as having children observe and experiment with sealed bags full of "once living materials", encouraging them to predict and later record what happens to the organic matter inside. As we can see, this simple side-project already encourages kids to learn through hands-on experience, and challenges them to think critically, ask themselves questions, and find the answers themselves.

Kids Gardening even offers suggestions to teachers on how to incorporate math problems into the lesson. For example, the students could measure the amount of compostable waste produced by the school cafeteria in the course of a week, and project a yearly amount. Similarly, they might also calculate "how much waste -- in total and percent, or projected over a multi-year period -- a school composting project might divert from the landfill, and how that translates into money such a project could save the

school" (www.kidsgardening.com 2004). It even suggests having older students monitor Carbon-Nitrogen ratio fluctuations in the compost.

I would like to describe another Classroom Project which beautifully demonstrates how experiences in a school garden can educate children on a variety of issues, the understanding of which is imperative to protecting the future of the environment and humanity's own well-being. Kids Gardening's featured classroom project at the time of research was "Creating a Pollinator Garden: Preserving a Precious Partnership". The lecture aspect of the project explains to students how and why plants need pollinators, and vice versa, and that the "amazing diversity of flowers results in large part from their fascinating adaptations that have evolved to lure pollinators." The students are then made aware that "one out of every three bites of food we eat is made possible by a pollinator, and eighty percent of all flowering plants rely on pollinators for survival. Without them, our gardens and lives would be less fruitful."

In addition, they are introduced the problems facing pollinators today, due to pesticides and the "fragmentation" of the land (which isolates plants) due to development. The pollinators and the plants are finding it more difficult to sustain each other. "By cultivating a garden, schoolyard, or even a few containers that allure these important plant partners, students can provide vital oases amidst deserts of buildings and concrete. They can, in turn, set up investigations of animal visitors and their sometimes flashy floral partners, and begin to understand how these threads of life connect" (www.kidsgardening.com 2003).

The project then offers tips for creating a pollinator safe-haven at the school. Kids are encouraged to observe beforehand which pollinators and plants are native to their area and have a hand in the planning of the garden. With this project they can feel the satisfaction of having done something to ease the struggle of other living beings, and contributing to the health of the environment at the same time. It also encourages instructors to help students take into account all aspects of the life cycle of both pollinator and plant, making sure to include a variety of plants that will provide food sources for all stages of insect development, the need for water, over-wintering sites, and biodiversity for the healthiest ecosystem.

Let's consider, now, all of the concepts – scientific or otherwise – touched on by this single project: mutualism among species, biodiversity, life cycles, botany (pollination and flower structure), agricultural pollution, development and fragmentation of natural landscapes, and the de-mystification of the origin of many of the foods we eat daily.

Eve Pranis (2007) writes in her article "Schoolyard Metamorphosis" that "'Kids can rally around these vibrant, ephemeral creatures,' explains Collegeville, Pennsylvania, teacher Sandy Sweeney. 'And by creating habitats for butterflies, students inadvertently invite and come to appreciate a whole range of other important (though less charming) organisms,' she adds. What's more, [pollinator] gardens can provide an engaging centerpiece for exploring life cycles, habitat components, adaptations, and plant/animal interactions, and for exploring the implications of human-influenced habitat loss."

There are many, many other projects in addition to the two just described above, many of which address topics beyond ecology and environmental awareness, venturing

into aspects of community, culture, art, and other branches of science. Some of the most notable titles, in my opinion, include: Creating a Pond Habitat: Learning with the Liquid of Life; Food and Culture: Exploring the Flavors of Your Community; Making Weather-Tracking Tools: Measuring Changes, Sleuthing Seasons, Testing Lore; Dyeing to Find Out: Extracting Nature's Colors; and lastly, Growing Garden Companions: Promoting Plant Partnerships (www.kidsgardening.com).

Similarly, there is an extensive list of "thematic explorations" which provides multiple resources including stories from other school gardens on broader themes an educator may be interested in. For example, one theme was highly relevant to the problems with modern agriculture discussed in previous chapters: "Gardening For A Sustainable Future". By adopting this Kids Gardening theme, students learn to garden organic from the start, and can realize that sustainable organic farming *is* possible, that we don't *need* pesticides and chemicals to have healthy, productive food sources. They develop a deeper understanding of the complexity of nature and the interactions of different components of an ecosystem. "They see gardens as living, regenerating systems that begin with healthy soil, use nutrients recycled from plants and other organic materials, and feature a diversity of plants and animal life. By encouraging beneficial interactions that help plants thrive and keep 'problems' in check, organic gardeners work in harmony with nature to create resilient systems" (http://www.kidsgardening.com).

Classroom stories provided to help with the educational goals of an organic garden include an account of a school program that employed ladybugs as natural pest control, another that explored the relationship between beans, peas, and other legumes, bacteria, and nitrogen fixation (essentially fertilization without chemicals) in the soil.

C. Case Study Three: Yale Sustainable Food Project

This case study is an examination of the potential for school gardens at a higher level of education. The Yale Sustainable Food Project was founded in 2001 by Yale students, faculty, and staff, President Richard Levin, and Alice Waters, with a goal of making the growing, cooking, and sharing food an integral part of each Yale student's experience (www.yale.edu/sustainablefood/overview). The Overview at the Food Project's official website clearly states the project's enlightened mission: "The Project was established with the understanding that many of the world's most important questions regarding health, culture, the environment, and the global economy are deeply connected to what we eat and how it is produced. Food cannot stand apart from agriculture, the environment, or the communities where it is grown."

The central goals of the Yale Sustainable Food Project seek to attain better well-being for Yale students, local farmers, ranchers and distributors, and on the highest level, of course, the long-term health of the local and global environment. The Project starts with the premise that food-buying practices and "our food choices have ethical and ecological impact...Our choices about food are integral to the University's goals of becoming a sustainable institution" (www.yale.edu/sustainable/food).

The project grew out of the efforts of Food From the Earth, a student group, to gain organic food services in university dining halls (Martineau 2006). A 2004 test kitchen was extremely successful and by 2005 one quarter of the Yale College menu incorporated local, seasonal, sustainable and organic foods. Yale's Office of Facilities

spearheaded institutional composting through the Integrated Waste Management Committee, and newly offered courses, such as "The Psychology, Biology, and Politics of Food," saw immense popularity. The Yale Sustainable Food Project recognizes the crucial truth which I hope to convey in the writing of this thesis, that "some of the world's most pressing questions regarding public health, obesity, environmental pollution, plant biology and genetics, and rural societies, are all, at core, questions linked to food and agriculture. Rigorous study of food and agriculture advances Yale's ability to contribute to local, national, and international dialogue issues" (www.yale.edu/sustainable/education).

The current Project involves a campus garden in conjunction with strong efforts to build ties with local growers, ranchers, and distributors to support local farms and bring in more fresh produce and animal products than the garden alone can provide. By contracting with local farmers, the Project helps lower their risk and likelihood to submit to outside pressures to sell their land. In 2006 the University spent 40% of its food budget on local and organic foods, and Yale estimates that the project redirected over $1 million into the local farm economy (Martineau 2006).

Here are just a few of the "purveyors" who do business with the Food Project in order to bring organic food to dining hall tables: pasture-raised beef is sourced from Northeast Family Farms Authentic Artisan Foods; all-natural lamb and cheese come from Beaver Book Farm, Connecticut; all-natural chicken from Murray's All Natural in New York; Old Maids Farm and High Hill Orchard, both located in Connecticut, provide some of the produce and local honey; organic pasta is obtained from Mama Del's; Yale also makes a point to purchase certified fair trade coffee, bananas, and chocolate, which

ensures that the growers receive a fair price for their labor (www.yale.edu.sustainable/food).

The students' response to the Project's contribution to their cafeteria fare has been overwhelmingly positive. A campus survey found that 83% find the Project food to be superior to other dining hall food; 90% said expansion of the Project was important and nearly 50% said it was "extremely important"; and lastly 79% said that the more sustainable food was served in their residential colleges, the more often they would eat there (www.yale.edu/sustainable/food).

So what about the campus farm itself? The following quote from www.yale.edu/sustainable/thefarm reveals the multiple purposes a campus garden can serve at the higher education level:

"The farm brings together undergraduates, graduate students, staff, and community members for education, recreation, and work throughout the year. Students and community members treat this lush acre as a refuge, a place that calls on them to use their hands and to experience the connection between food and the land. Professors from a variety of disciplines—from soil science to psychology—use the farm as a resource in their coursework, and teachers from New Haven schools bring their classes to the farm for lessons in ecology, science, and food production. The farm also serves as a favorite place to relax; often students come to walk, read, study, or draw."

The farm strives to be an efficient, sustainable enterprise that is both economically and environmentally sound. Both nutrition and aesthetics in the food are important. Also, those involved "look to natural ecosystem dynamics to guide our thinking about our cultural practices". The one-acre farm produces over two hundred varieties of vegetables, fruits, herbs, and flowers, with volunteers and students work two to five days a week, depending on the season. Some of the produce is sold in local markets and restaurants (Martineau 2006).

The project is currently setting an example for the expanding movement in universities throughout the country to include healthy sustainable food and farming practices in their curriculum and dining hall menus. Unfortunately, even for Yale, cost is still the largest obstacle cited, though Yale admits the short growing season and high price of land in the area contributes to budget problems that other areas may escape from (Martineau 2006).

D. Summary

These three studies demonstrate the opportunities provided through school gardening programs at every level of education. The Edible Schoolyard integrates garden and kitchen "classrooms" to provide a well-rounded garden based learning experience for its students. Journals and well-structured, themed lessons emphasize community, connectedness, and respect between all members involved. Kids Gardening offers endless examples of the possibilities for education in the scientific, artistic, and cultural realms through the vehicle of school gardens. It demonstrates that the concept of school garden projects is thoroughly developed, showing that any such project, once under way, will not lack for resources and lesson plans to keep it healthy and functioning. And, the Yale Sustainable Food Project is the manifestation of the efforts of student, faculty, and administrative leaders at a university level who understand that the vitally important "ability to contribute to local, national, and international dialogue issues" is possible through an understanding of questions linked to food and agriculture. In all of these studies, a pattern arises wherein complimentary exchange of ideas and activities between

the outdoor garden "classroom" and the traditional, indoor setting is recognized as intrinsic to the garden project concept.

CHAPTER FOUR

JOURNAL ARTICLE ANALYSIS AND DISCUSSION

Several journal articles document scientific research conducted on the effectiveness of school gardening programs on various factors concerning student achievement and well-being. The results are encouraging and, in light of the information found in the case studies, not all that surprising.

An early study looked at fifty-two students, five teachers, and three parents at an elementary school in San Antonio, Texas. Researchers conducted "qualitative interviews", utilizing the "constant comparative method", a method of analysis for studies where there are multiple sources of data (Alexander, North, and Hendren 1995). The authors state in their results that "data indicate that the garden has had many positive effects on the school children" (Alexander, et. al 1995:132). One of six themes which arose in the study was moral development. Participants felt there were many opportunities for children in the project to learn in a non-academic sense, including "delayed gratification, independence, cooperation, self esteem, motivation, pride in their activities" (Alexander, et. al 1995:127).

This is quite similar to the nurturing effect of the "Garden Journals" and "special spots" for students participating in the Edible Schoolyard case study described in

Chapter Three. The Berkeley students were encouraged to become more aesthetically aware of their surrounding environment, while simultaneously developing their artistic and creative writing skills in their Journals. Likewise, for the San Antonio students, "Tending their small plots has given them opportunities to find out what it means to care for and nurture living things, patience as they wait for things to grow, ways to delay gratification, and opportunities to let others have the pleasure of seeing things come to fruition" (Alexander, et. al 1995:128). The school principal noted that the children were seeing things in the garden that they did not necessarily see in the home or elsewhere.

Teachers and parents alike affirmed that academic learning had been enhanced. One teacher expressed appreciation for the project, stating it correlated to all of her other subjects (Alexander, et al 1995:128). This correlation has already been made evident in each of the three case studies of Chapter Three. Teachers noted that parent participation and enthusiasm also increased and many families started gardens at home. We can see here how the children were already having a positive influence on their world outside of the garden project. The study reports "anywhere from half to three-fourths of these students now have families that are gardening" (Alexander, et. al 1995:129). Lastly, the researchers also note that "pleasant experiences" came out as a major theme (Alexander, et. al 1995:130). The study concludes by raising the important point that more comprehensive, long-term studies are needed, perhaps following the same children as they progress through grades, as well as enlarging the number of participants.

In their article, *Impact of hands-on science through school gardening in Louisiana public elementary schools,* Smith and Motsenbocker (2005) examine garden

programs introduced into three East Baton Rouge Parish (Louisiana) elementary schools in 2002. The program was conducted by community and Louisiana State University volunteers. Students had two hours of garden curriculum per week. "Science achievement tests, developed at Texas A&M University specifically for the Junior Master Gardener program, were given before and after the students participated in the gardening activities to determine whether or not the activities helped improve achievement scores" (Smith and Motsenbocker 2005: Abstract). The control class exhibited no change in achievement level between pre-test and post-test scores. However, the experimental class's science achievement scores were "significantly different." The study concludes that, while there are many variables which may have affected the outcome, results still strongly suggest that weekly hands-on gardening activities can significantly raise student achievement in science. A review of Kids Gardening thematic lessons, such as "Building Soil Nature's Way" and "Creating a Pollinator Garden" discussed in the case studies, should already strongly suggest that a gardening program should improve children's understanding of scientific and mathematical concepts, and that this would logically correlate to their academic performance in the classroom. Although, as Alexander (1995) pointed out, more comprehensive studies of these programs are needed, the results of Smith and Motsenbocker's study offer strong initial support for such a suggestion.

A study on the impact of an after school gardening program on children's vegetable intake and physical activity (Hermann, Parker, et al. 2006: 201-202) focused on the Oklahoma Cooperative Extension Service (OCES) after-school education and gardening program, which provided hands-on nutrition, food preparation, food safety, and physical fitness education. The researchers found that the program was an effective

means for improving children's eating and exercise habits. The article also notes that "the garden was also an ideal way to incorporate and teach Native American culture by growing and preparing traditional foods" (Hermann, Parker, etal. 2006). Here then is a documented example of the multi-faceted nature of gardening programs, providing evidence of that the subjects' nutritional and cultural knowledge and been enhanced.

Graham and Zidenberg-Cherr (2005:1797-1800) conducted a questionnaire-based study to determine California elementary school teachers' perceived attitudes toward garden programs at their schools, "as well as the purpose and use of gardens in schools, specifically in relation to the link between gardens and nutrition. The questionnaire was mailed to 1,665 California schools with gardens, receiving responses from 592 of them. The results of this study also allude to the multifarious benefits of gardening programs. "Teachers perceived the garden to be somewhat to very effective at enhancing academic performance, physical activity, language arts, and healthful eating habits" (Graham and Zidenberg-Cherr 2005).

The same researchers authored an article entitled *Use of School Gardens in Academic Instruction*. They acknowledge that it has already been demonstrated that "environmentally-based" education is beneficial to academic achievement, as well as "attention and enthusiasm for learning" (Graham and Zidenberg-Cherr 2005:147). Academic improvement is the most frequently cited reason by school leaders for developing a school gardening program, with 89% of school principals responding affirmatively to this motive on a questionnaire, while 60% of principals also reported the desire for more extracurricular activities as a motivation (Graham and Zidenberg-Cherr

2005:149). The programs have also been shown to decrease discipline issues in the classroom.

Graham and Zidenberg-Cherr (2005:147) also write, "Studies conducted using school gardens and structured garden-enhanced nutrition education curriculum applying Social Cognitive Theory have reported increases in students' fruit and vegetable consumption." The program strengthened the students' preference for vegetables and increased their nutritional knowledge (Graham and Zidenberg-Cherr 2005:149). The authors conclude that the nutritional aspect of garden programs is equally as important as the more highly emphasized academic benefits. They maintain that "the link between the garden and the school meal program is an area that clearly requires attention because the school meal program possesses the ability to provide students with an opportunity to integrate experiences from the garden into their lunch meal choices" (Graham and Zidenberg-Cherr 2005:150).

Another study takes a different approach to the evaluation of school gardens' effectiveness by choosing to focus not on academic achievement, but on "life skills" -- which can be seen as equally important. In *Growing minds: the effects of a one-year school garden program on six constructs of life skills of elementary school children*, Robinson and Zajicek (2005) attempt to "assess changes in the life skill development of elementary school students participating in a 1-year school garden program." The "life skills" concerned here were teamwork, self-understanding, leadership, decision making skills, communication skills, and volunteerism. Once again the researchers gathered data on an experimental group that participated in a gardening program, and a control group that did not. Prior to the experiment, the control group had "significantly higher life skill

scores on the pretest." According to Robinson and Zajicek, after the program that gap between the groups had closed entirely. The control group's life skill score had not altered in any way, while the experimental group's score had risen markedly. The authors also cite two specific life skills which rose most significantly as a result of participating in the gardening program: working with groups and self-understanding.

Yet another study for the *American School Board Journal*, entitled "Landscape Learning", "encourages school leaders to consider the reported relationships between natural playgrounds and children's behavior and classroom learning" (Black 2006:46). Black notes that many schools are moving away from, rather than towards, the presence of "outdoor learning sites" in their students' lives. School leaders are eliminating recess in order to extend "seat time for classroom lessons and practice tests" (Black 2006:47). Black cites an elementary school recently constructed in Georgia that has no outdoor play area whatsoever. Black believes school leaders should realize that outdoor learning sites (such as a school garden) can be just as important as indoor sites such as gyms, music rooms, and computer labs. Additionally, "many school leaders overlook the symbolic messages their school grounds convey to students and the neighboring community. Johnson contrasts the not so-subtle impressions suggested by landscapes surrounding two Seattle schools. One has an attractive garden and a courtyard with benches where students study and socialize, similar to an Ivy League college campus; the other has a meager asphalt play area surrounded by a chain-link fence, similar to a prison yard" (Black 2006:47).

The important question is, do "naturalized" school environments actually contribute to students' learning? More rigorous research is still needed, of course, but

nevertheless consider these following reported relationships between natural playgrounds, children's behavior, and classroom learning (Black 2006:47):

"-Children with ADHD are able to concentrate better when they return to their classrooms.

-Children acquire better physical skills, such as coordination, balance, and agility.

-Children who play with natural items, such as pebbles and water, are more imaginative and creative and are better at observing and reasoning.

-Children show fewer antisocial behaviors, such as bullying, vandalism, and fighting.

-Children are absent and ill less often."

Again, such statements are by no means conclusive, but offer support to Graham and Zidenberg-Cherr's (2005) report that the programs they studied appeared to decrease discipline issues in the classroom. The following two studies also report elements of positive behavior modification in their results.

An article was prepared by the National Gardening Association in order to provide research support for their Kids' Gardening program, and easy access to the public to a distillation of the findings of various such scholarly articles over time (http://www.kidsgardening.com/2005.kids.garden.news/research.pdf). The 2002 article, entitled "Tips and Techniques from the National Gardening Association: Research Support for Kids' Gardening", reports the findings of a University of South Carolina

study on third and fourth graders participating in a summer school garden project. Results of formal pre- and post-tests of achievement (Peabody Individual Achievement Test), self-esteem (Coopersmith Self-Esteem Inventory), and attitudes toward school (School Attitude Measure) indicated greater gains in all three areas than control classes made. The conclusion that "improved social skills and behavior are the most prominent benefits to kids reported by gardening teachers nationwide" also supports the claims of Graham and Zidenberg-Cherr (2005) that there is much more of value to garden programs than academic improvement alone. NGA also writes of a 1997 Virginia Tech study which interviewed teachers who had integrated gardening into their curriculum. "Seventy-five percent reported that student behavior often or always improves when the garden is a learning context."

In *Harvest for Hope,* Jane Goodall tells of two meaningful studies conducted by Stephen J. Schoenthaler, Ph. D., a sociology professor at California State University. Schoenthaler was intrigued by the possible link between the rise of fast food consumption, processed sugar consumption, and incidences of useless violence. He conducted a study on a large-scale prison facility in Virginia, during which prisoners were initially fed a typical "American" diet of white bread, red meat, fried foods, sweets, and soft drinks. After a few days they were switched to a "whole food diet" of whole grains, lean meats such as fish, and many fruits and vegetables. "The results were remarkable," writes Goodall. After the switch, behavior problems "immediately decreased." And when they were switched back to the unhealthy diet, the behavior problems returned. Schoenthaler followed up with a parallel study on 8,000 teenagers at juvenile correction facilities. "During that year, the facilities reported that the incidence

of physical violence, verbal abuse, and escape and suicide attempts decreased by almost half" (Goodall 2005:246-247).

Summary

In short, these academic articles provide scholarly support for what has already been implied in the case studies of Chapter Three. The holistic, inclusive, interactive and participatory approach to education taken by school gardening programs provides precious opportunities to students to improve their academic performance, enhance their diet and nutritional knowledge, nurture their aesthetic and creative senses, and harmonize their interactions with peers and authority figures by encouraging cooperation and reducing disciplinary problems.

healthy foods produced with respect for the environment improves our bodies, gives us a sense of connection and well-being, strengthens economies, and increases performance in both academic and "life-skill" settings. By instituting school gardening programs, we can help change the next generation for the better and teach them to be good stewards of the Earth and themselves. "Teaching children how to prepare and enjoy these diverse foods of the earth is the foundation for stopping the obesity crisis in its tracks while also saving the planet from the ravages of industrial agriculture" (Goodall 2005:229). And, most importantly, we can help return to them (and ourselves) the ultimate powers of knowledge, awareness, and free will – the freedom to choose what we eat, the awareness of where it comes from, and the knowledge of how it was made. And embedded within each of these choices will be the ability to choose a better future at every level: for ourselves, for our country, and for the world.

LIST OF REFERENCES

Alexander, Jacquelyn, Mary-Wales North, and Deborah K. Hendren. 1995. "Master Gardener Classroom Garden Project: An Evaluation of the Benefits to Children." *Children's Environments* Vol. 12, Issue 2:123-133.

Barber, Benjamin R. 1992. "Jihad vs. McWorld." *The Atlantic Monthly*, Vol. 269, Issue 3. Accessed: www.theatlantic.com March 29, 2007.

Black, Susan. 2006. "Landscape Learning." *American School Board Journal*, Vol. 193, Issue 3:46-48.

Brewis, Joanna and Gavin Jack. 2005. "Pushing Speed? The Marketing of Fast and Convenience Food." *Consumption, Markets and Culture.* Vol 8: 49-67.

Cavallini, Massimo. 2001. "Fat City USA" in *Slow Food: Collected Thoughts on Taste, Tradition, and the Honest Pleasures of Food,* edited by Carlo Petrini, pp. 26-27. Vermont: Chelsea Green Publishing Company.

Eaton, S. Boyd and Melvin Konner. 2000. "Paleolithic Nutrtion: A Consideration of its Nature and Current Implications." in *Nutritional Anthropology: Biocultural Perspectives on Food and Nutrition*, edited by Gretel H. Pelto, Alan H. Goodman, and Darna L. Dufour, pp. 62-69. London: Mayfield Publishing Company.

Goodall, Jane. 2005. *Harvest for Hope: A Guide to Mindful Eating.* New York: Warner Books.

Goodman, Alan H., Darna L. Dufour and Gretel H. Pelto, eds. 2000. *Nutritional Anthropology: Biolcultural Perspectives on Food and Nutrition.* London: Mayfield Publishing Company.

Graham, Heather and Sheri Zidenberg-Cherr. 2005. "California Teachers Perceive School Gardens as an Effective Nutritional Tool to Promote Healthful Eating Habits." *Journal of the American Dietetic Association*, Vol. 105, Issue 11:1797-1800.

Graham, Heather; Beall, Deborah Lane; Lussier, Mary; McLaughlin, Pegg; Zidenberg-Cherr, Sheri. 2005. "Use of School Gardens in Academic Instruction." *Journal of Nutrition Education & Behavior,* Vol. 37, Issue 3:147-151.

Hermann, Janice R.; Parker, Stephany P.; Brown, Barbara J.; Siewe, Youmasu K.; Denney, Barbara A.; Walker, Sarah J. 2006. "After-School Gardening Improves Children's Reported Vegetable Intake and Physical Activity." *Journal of Nutrition Education & Behavior,* May/Jun2006, Vol. 38, Issue 3:201-202.

Kimbrell, Andrew. 2002. *The Fatal Harvest Reader: The tragedy of industrial agriculture.* Washington: Island Press.

Kirschenmann, Frederick. 2003. "The Current State of Agriculture: Does It Have a Future?" in *The Essential Agrarian Reader*, edited by Norman Wirzba, pp 101-120. Washington, D.C.: Shoemaker and Hoard.

Kottak, Conrad P. 2000. "Rituals at McDonald's." in *Nutritional Anthropology: Biocultural Perspectives on Food and Nutrition*, edited by Gretel H. Pelto, Alan H. Goodman, and Darna L. Dufour, pp. 157-161. London: Mayfield Publishing Company.

Kummer, Corby. 2002. *The Pleasures of Slow Food: Celebrating Authentic Traditions, Flavors, and Recipes*. San Francisco: Chronicle Books.

Martineau, Kim. 2006. "Fields of Learning: Eating Local and Organic Foods Is – Literally – A Growing Movement On Campus." In *The Courant* (accessed online at www.courant.com October 5, 2006.)

Milton, Katharine. 2000. "Diet and Primate Evolution." in *Nutritional Anthropology: Biocultural Perspectives on Food and Nutrition*, edited by Gretel H. Pelto, Alan H. Goodman, and Darna L. Dufour, pp. 46-54. London: Mayfield Publishing Company.

Paul, Pamela. June 12, 2006. "Rethinking First Foods." In *TIME* magazine, pp. 58-59.

Petrini, Carlo. 2001. *Slow Food: The Case for Taste*. New York: Columbia University Press.

Ritzer, George. 2003. "Rethinking Globalization: Glocalization/Globalization and Something/Nothing." *Sociological Theory*, Vol 21: 193-209

Robinson, C. W. and J. M. Zajicek. 2005 "Growing minds: the effects of a one-year school garden program on six constructs of life skills of elementary school children." *HortTechnology*, Vol. 15: 453-457.

Roosevelt, Margot. June 12, 2006. "The Grass-Fed Revolution." In *TIME* magazine, pp. 76-78.

Schlosser, Eric. 2002. *Fast Food Nation: the dark side of the all-American meal*. New York: Perennial.

Shiva, Vandana. 2003. "Globalization and the War against Farmers and the Land." in *The Essential Agrarian Reader*, edited by Norman Wirzba, pp 121-139. Washington, D.C.: Shoemaker and Hoard.

Smith, L. L. and C. E. Motsenbocker. 2005 "Impact of hands-on science through school gardening in Louisiana public elementary schools." *HortTechnology* Vol. 15, Issue 3:439-443.

Waters, Alice. 2006. "A Message from Alice Waters: Slow Food, Slow Schools: Transforming Education Through A School Lunch Curriculum." Accessed at www.edibleschoolyard.org November 4, 2006.

WEBSITES:

http://www.cdc.gov/nchs/ Centers for Disease Control and Prevention, Atlanta, GA. Webmaster: US Department of Health and Human Services. Accessed November 15, 2006.

www.edibleschoolyard.org: website for "The Edible Schoolyard" at Martin Luther King, Jr. Middle School in Berkeley, CA. © 2006 The Edible Schoolyard. Accessed November 4, 2006.

http://assoc.garden.org/about: National Gardening Association. © 2007, National Gardening Association. Accessed February 8, 2007.

www.kidsgardening.com: KidsGardening.org, a National Gardening Association Organization © 2007 National Gardening Association. Accessed February 8, 2007.

"Building Soil Nature's Way: Exploring Decomposition and Soil Health." 2004. Accessed at www.kidsgardening.com February 8, 2007.

Pranis, Eve. 2007. "Schoolyard Metamorphosis." Accessed at www.kidsgardening.com February 9, 2007.

"Creating a Pollinator Garden: Preserving a Precious Partnership." 2003. Accessed at www.kidsgardening.com February 9, 2007.

"Research Support for Kids' Gardening." http://www.kidsgardening.com/2005.kids.garden.news/research.pdf Copyright © 2002 National Gardening Association. Accessed February 9, 2007.

The Yale Sustainable Food Project: www.yale.edu/sustainablefood/overview, www.yale.edu/sustainable/food, www.yale.edu/sustainable/education. Yale University, New Haven, CT. Accessed February 9, 2007.