Growing a Better Food System: An Analysis of the Impact of California School Gardens on the Sustainable Food and Food Security Movements

Michael Press

Pomona College

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Growing a Better Food System:  
An Analysis of the Impact of California School Gardens  
on the Sustainable Food and Food Security Movements  

A Senior Thesis Presented  

by  

Michael Press  

To  

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ABSTRACT

In recent decades, environmental problems associated with conventional agriculture, children’s nutrition, and concern over the adequacy of the current food supply have led to the emergence of the sustainable food and food security movements. These issues have also inspired the state of California to pass legislation to place a garden in every school in the state. This thesis analyzes the accuracy of this policy’s implementation and its effects on the sustainable food and food security movements. Research found that the loss of state funding for this policy and the administrative, logistical, and informational barriers to establishing garden education programs has meant that only about a third of California schools have gardens. The gardens that do exist demonstrate excellent benefits in terms of educational and nutritional goals, but only help the sustainable food and food security movements to a limited extent. Suggestions for future improvement include obtaining state funding for the program once more, expanding existing gardens to produce more food and increase the impact on food production issues, and increase informational and technical support for teachers. Nevertheless, the program has been successful at establishing itself and is continuing to grow, thus showing great promise for the future.
INTRODUCTION: FOOD, HEALTH, AND THE ENVIRONMENT

The Problem

My greatest interest as an environmentalist is sustainable food. Food plays a vital role in the life of every organism on the planet and without proper food, every organism will die. I make an important distinction by using the word ‘proper.’ Biotic organisms will not survive without food, nor will they survive without ‘proper’ food. In today’s world of industrial agriculture, much less emphasis is placed on the quality of the food that is produced than on the quantity produced and the profits that can be made from that production. Food which is not ‘proper’ is marketed to us every day. We eat food with residues from poisonous pesticides, food that is filled with artificial chemicals, food treated with hormones, and food that is simply unhealthy. Much of this food is also produced with the use of fertilizers, antibiotics, monocultures, genetic modification, misuse of water, misuse of soil, and other practices that harm the environment in a host of ways, from air pollution to erosion.

Clearly, the environmental problems with conventional agricultural practices are many. Rather than focus on each of these problems individually, I see more value in concentrating on solutions that completely deviate from the philosophy of conventional agriculture and focus on indefinitely providing sustainable and healthy food to consumers rather than producing the highest possible yields and making the highest possible profits (Kimbrell, Andrew ed., Fatal Harvest).

Sustainable food is somewhat difficult to define. For some time, the word to describe sustainable food has been “organic,” but under US Department of Agriculture definitions of organic, many large scale corporations and farmers have been able to slip
into the organic market while still over-irrigating, shipping food unnecessarily long distances, spraying certain pesticides, and using other unsustainable farming methods. The common definition of “sustainable” is “meeting the needs of the present without compromising the ability of future generations to meet their own needs” (Bruntland et al., 1987). “Sustainable food” then means food that is produced utilizing principles which show concern for the future. These include the integration of natural processes, the minimization of non-renewable inputs like fossil fuels, substitution of human capital for other inputs, reducing the distance that food travels, and overall concern and consideration for other aspects of the environment (ed. Hester and Harrison, 2005). It is important to understand the differences between different farming methods and philosophies as no two farming operations affect the environment in the same way.

Finding sustainable food solutions is a great challenge for a number of reasons. Sustainable food is typically more expensive than conventionally produced food because economic externalities are internalized in the growing process. Large agribusiness corporations operate at scale on very small profit margins so as to undercut other producers and capture more of the market. This makes conventionally produced food unnaturally cheap and therefore more desirable in one respect. The scale of industrial agriculture also enables the transportation of food over great distances in short periods of time, virtually eliminating the limitations of seasonal foods. Being able to eat summer fruit from the Southern Hemisphere in winter is another appealing quality that would probably not be possible in a purely sustainable food system. These conveniences naturally attract consumers to products of conventional agriculture.
Another very significant barrier to an expanded market for sustainable agriculture is simply a lack of knowledge among the public about both the problems with conventional agriculture and the merits of sustainable, organic, and local agriculture. Some of this ignorance is attributable to the furious advertising and information concealment of large agribusiness with regards to their products. More importantly, however, is the fact that people simply do not learn about food production and distribution in school or anywhere else unless they go hunting for the information independently. Most people do not know where their food comes from or how it was grown or produced. The public assumes that the government takes care of all the questions about whether the food is healthy or whether it is produced in an acceptable way, hoping to spare themselves the worry.

Laws and regulations concerning agricultural practices are improving in many ways for extreme cases, but certain risks are allowed to slide for the sake of unhindered production. Additionally, the agricultural lobby is a very powerful entity in politics, making anti-corporate reforms difficult. This means that many foods are knowingly grown using methods that are harmful to both the environment and the consumers and furthermore, that many of these products are not labeled with full product information, thus keeping the buyer unaware.

One Solution

A host of solutions have been proposed to this problem and it is likely that they will all be necessary to affect major changes in the food system. Some movements seek to counter the strong conventional agriculture lobby in Washington DC which fosters
unfair legislation and unregulated subsidies to large farming corporations. Others focus on stricter government oversight of health and safety standards for conventionally grown food. A market solution is to encourage organic, sustainable, and local foods to replace the tainted conventional ones. A justice-oriented solution is to ensure that healthy, nutritious food is made available without interruption to all people regardless of class, race, ethnicity, religion, or any other category of segregation.

For years now, sustainable food and food security movements have been attempting to offer alternatives to some of the problems with conventional agriculture, but recently they have been gaining speed and followers at greater rates. Movements such as the Community Food Security Coalition and Slow Food USA focus on sustainable, ecologically secure, and socially just methods of food production and distribution. This means food that is grown sustainably, locally, and is readily available to those in need. These and other organizations sponsor and implement a number of programs working with others involved in sustainable agriculture, farmers’ markets, supporting policy initiatives, and education through “farm to school” programs. One aspect of “farm to school” is school gardens.

Although many schools have had gardens on school grounds and used them for educational purposes for many years, the modern concept of a school garden for the purpose of educating youth in nutrition, sustainable food systems, and other environmental issues was visibly pioneered by Alice Waters in 1994 at Martin Luther King Jr. Middle School in Berkeley, California. Her project there, “The Edible Schoolyard,” sparked a number of changes within the school that led to its national recognition for advances in nutrition, education, and sustainability. Much of the focus
began with enhancing the education of the students through the use of a schoolyard garden and assumed more responsibilities along the way. These included focusing on sustainable methods of food production, teaching nutrition to students, and improvements in the school cafeteria and the meals students eat there.

School gardens are quite multi-faceted. I am interested in them because of my concerns for sustainable agriculture and food security. But these gardens address many other important issues such as children’s nutrition, improvements in the educational system, and waste management. Many of these themes are interconnected, though the focus may differ from one to the next. With regards to sustainable food, the gardens provide a number of benefits. Most school gardens are organic in nature, that is, they are maintained without the use of chemical pesticides or fertilizers, genetically modified seeds, the use of monocultures, excessive irrigation, over-tilling, or other unsustainable conventional practices. Some concentrate on the waste stream and emphasize recycling, composting, and vermicomposting. The most important aspect however is the education that children receive about the origin of food and the nature of agriculture. Many major problems with conventional agriculture are directly associated with an informational disconnect between food producers and food consumers. By teaching children about exactly where the food they eat comes from, we develop more knowledgeable and intelligent adults who are more likely to make sustainable choices and encourage others to do the same.
History of A Garden in Every School

The publicity received by the Edible Schoolyard is evidence of the growing importance of food, nutrition, and sustainability issues among California State schools. This paradigm shift eventually culminated in 1995 with a call by California Superintendent of Public Education Delaine Eastin for a garden in every California school by the year 2000 (Lovett, 2005). However, seeds for this program were planted as early as 1990 when the Youth Gardening Coordinator for the Los Angeles office of the University of California Cooperative Extension’s Common Ground Garden Program, Rachel Mabie, began the Gardening Angels Volunteer Program with the goal of establishing a garden in every school in her region, especially those schools in inner city and urban areas where she perceived that children were not in touch with the environment (Freeman, Bonnie, and Rees, Jennifer, “School Garden Start-Up Guide”). This program developed over time and eventually placed a garden in every school in the Santa Monica/Malibu Unified School District. School gardens existed even earlier than this, however. Many schools have had them for decades, independent of any government program or efforts for inter-school coordination. Organized and popular programs such as the Edible Schoolyard and the Gardening Angels simply gave gardens more attention and publicity.

The primary motivation for the “Garden in Every School” program stemmed from nutritional concerns about mushrooming rates of childhood obesity and diabetes, among other pediatric nutrition-related health concerns which have only increased in recent years. Notably, the National Institute of Health released a statement declaring that “16% of children and teens ages six to 19 are overweight” and that “Overweight and obesity
increase the risk of developing numerous serious health problems, including heart disease and type 2 diabetes” (Spiegel and Nabel, *Statement on NIH Research on Obesity and Type 2 Diabetes*, 2006). Less than 13% of children eat the USDA recommended amount of fruit, and 20% of children eat less than one serving of vegetables every day (“Farm to Cafeteria Legislation Fact Sheet, 2003). Besides the obvious impacts of obesity and malnutrition, such decreased consumption of fruits and vegetables can affect children’s ability to learn and function normally.

Everyone sees the problem of children’s nutrition differently. Parents worry over their children’s obesity and diabetes, both of which have reached unheard of percentages in recent years and are still growing. Educators find students hyperactive from excessive sugar consumption or unenthusiastic in the classroom thanks to improper diet. Environmentalists worry about the tolls on resources from producing the packaged, distant food of today and the daunting waste stream polluting our world. Food security workers worry that many people are left without an adequate and healthy food supply. And agribusinesses and fast food corporations do not necessarily view children’s nutrition to be a problem except when it comes to trying to think of the next best strategy to make their way into the diets of the next generation.

School gardens may seem like a very benign way of dealing with what many consider to be a national food and nutrition crisis or the devastation and unsustainability of conventional agriculture. However, by initiating a comprehensive educational policy in schools, the hope is that our youth will grow up with a greater awareness of food production and associated environmental issues, as well as eating and having better access to healthier, more sustainably produced food. This approach requires only limited
funds and reaches beyond the state’s children and educators to involve the surrounding communities in realizing the food connections we take for granted. By bringing new green spaces to the neighborhood which provide a hands-on approach to teaching, children learn about science, nutrition, composting and waste streams, the benefits of sustainable agriculture, and eat well while doing so.

The Instructional School Gardens Program was passed as a law in 1999 with good intentions and the special fervor of Secretary Eastin. But within a few years, the program lost funding long before every California school had a garden. Fortunately, schools have taken up the call on their own and several organizations, especially the Western Growers Association and California Fertilizer Foundation, stand out as replacements for the state as grant givers. With their help, a great many more schools have begun to develop gardens for use in education and nutrition despite the failure of the state to continue their program with the same vigor.

The money goes to providing the space necessary for the garden, its construction, tools, soil, seeds, educators, and the curricular development. Schools that obtained state funding were provided with state guidelines for garden education and methods of incorporating the garden into other classes. Even without funding, teachers today are able to request free information detailing ways in which to establish a school garden program and suggestions for aid.

The nature of many garden projects is not as formal as this though. Many schools obtain funds or assistance from organizations designed to help them in just this way. University of California extension programs also offer a great deal of aid in technical areas. But sometimes gardens develop independently of official channels. A teacher or
principal may feel the need for a garden and create one independently, using school funds or donations from nearby businesses (Kubani, Dean and Freeman, Bonnie, 1999). In some cases, gardens do not even originate with a school, but instead, with a surrounding neighborhood in which there is sufficient interest in local food and personal gardening. The school is simply used for the space at first, but slowly the garden makes its way into the curriculum and is adopted as a project that is jointly managed by the school and the neighborhood. Despite the origin of the garden, the mission is often the same: improve education, nutrition, and the environment through the use of natural media.

The Question

All this is good in theory, but setting up and running a school garden is a significant challenge for many schools. Responsibility can be heaped on just one overburdened teacher, supplies, space, and funds can be lacking, interest can be lacking, or, if there is a garden, it may not be used appropriately. The result of these barriers are that many gardens and garden education curricula do not match the standard set by the state and thus address the problems of sustainable and secure food with less comprehensiveness than one would hope for.

The question I initially set out to address was: to what degree are school gardens in California actually educating students about the problems posed by conventional agriculture and the desirability of more sustainable and secure food systems? Sustainable and secure food was the reason I first became interested in school gardens. However, the analytical basis is not very concrete for deciding how beneficial gardens are to the sustainable food movement. Therefore, I decided to shift the focus to concentrate on the
implementation of school garden policy in California as a whole while incorporating a case study of Santa Monica/Malibu Unified School District. By doing so, I can then analyze the effectiveness of school gardens in terms of the original intent of the policy, the policy message as it is received by schools, and, to a certain degree, the objectives of other organizations and the public who are involved with school gardens.

**Hypotheses**

Because the original impetus for the Instructional School Garden Program (A Garden in Every School) was improving children’s health and nutrition, I hypothesized that those goals would be given special attention and carried out more completely than other aspects of the program. The policy was well supported by the CDE and the state legislature and 13% of California schools used garden education prior to A Garden in Every School, so it also seemed likely that the policy would be effective at placing more gardens in schools (Graham et al., 2005).

From the outset, I felt that the effects of school gardens on sustainable food would be defined in rather broad terms considering the original mission of school gardens from the perspective of California State was to improve nutrition and education in food issues and waste streams, not specifically to address sustainable or secure food. Therefore, the effects that gardens would have on the environmental goals of sustainable agriculture and environmental justice goals of food security would be direct in some aspects, and indirect in others. I hypothesized that the direct effects of garden education programs, that is, the use of organic growing methods, the ready availability of healthy garden food, and waste
stream considerations, would be significant for the first two issues, but would not be especially significant for the last.

Because most gardens are organic, it seemed reasonable to predict that organic methods would have a significant impact because they are in such wide use and affect everyone who uses the gardens. Similarly, since the main reason for any garden is to grow desirable plants, and in this case, food crops, it seemed logical to suppose that any garden dedicated to that purpose would reliably produce a significant amount of food. However, because CIWMB was brought into the Instructional School Gardens Program primarily for reasons of funding and because they soon lost funding, I predicted that their goals of waste stream considerations would be somewhat overlooked and no significant impact would be seen.

I hypothesized that, in terms of indirect effects, reasoned choices in the future as a result of garden education and increased nutritional knowledge would be more noticeable than direct effects. Teaching children about nutrition and the food system were two of the main priorities when the policy was initiated. It follows that these would be areas that extra time and resources were expended, thus leading to significant impacts on food sustainability and security.

I supposed also that the degree to which these effects were significant would vary widely. In well-funded schools with interest from the teachers, it makes sense that the gardens would accomplish a great deal, but that for most schools that did not have access to the same resources, funding would limit the scope of school gardens to a beginning phase which would have yet to become an integral part of the schools and the movement for sustainable food. This is an especially important consideration in terms of
environmental justice because of the implications of an unfair distribution of program effectiveness based on socio-economic qualities.

**Methods**

The research for this thesis was carried out primarily at two levels: the policy level including both governmental agencies and organizations operating independently of the state, and the level of the school where garden education is actually taking place. Approaching the problem from both levels was necessary to comprehend the full nature of how school gardens are operating in as a whole in California and interconnectedness of funding, information, and support from the school to the state.

Due to constraints of funding, resources, and especially time, the methods for examining the above question had to exclude a broad survey. Instead, I relied heavily on interviews, internal documents, sustainable food and agriculture literature, and information gleaned from other studies. Interviews included the program coordinators at the Western Growers Association (WGA) and the California Fertilizer Foundation (CFF), the Santa Monica/Malibu Unified School District (SMMUSD) nutrition specialist, the SMMUSD garden program coordinator, and teachers at SMMUSD schools. I acquired internal documents from the California Department of Education (CDE), CFF, and SMMUSD staff and teachers. Most of these documents are intended for teachers to guide them in setting up gardens at their schools and to aid them in developing curricula. To get a more concrete sense of school gardens, I visited four school gardens in SMMUSD: McKinley Elementary, SMASH Alternative School, Santa Monica High School, and John Muir Elementary. I was guided on the tour of the gardens by Debbie Harding, the
SMMUSD Garden Program Coordinator who pointed out the key features of each. Other research drew from sustainable food literature and studies concerning the existence of and barriers to the existence of school gardens.
The Tragedy of the Current Food System

The truth is that the past century has seen a number of radical changes in the way that food is produced, transported, purchased, consumed, and disposed of. Today the food products in the United States we eat comes from an average of approximately 1500 miles away, and are produced using unsustainable techniques. Furthermore, they are processed and packaged with excess waste and chemicals (Garcia, 2004). The result is people who suffer from poor health in the form of, to name just a few diseases, obesity, diabetes, cancer, heart disease, malnutrition, infertility, and high blood pressure and an environment that suffers from erosion, pollution, eutrophication, deforestation, ecosystem destruction, loss of biological diversity, and many other calamities. The modern agricultural machine is not designed to provide nutritious food to people, but to make money in the global market. If this means importing fruit from South America, using poisonous pesticides and fertilizers, and leveling the rainforest, then that is what will happen.

Food is something that affects everyone and that affects everyone differently. Each individual has their own personal tastes and beliefs about the importance of food and meals. However, social meals have become less important and more people eat alone in recent years (Waters, 2005). There are dozens of reasons for the modern state of food and agriculture, but among these, many thinkers concerned with the effect of the current food system have discussed and written about the disconnect between people and the origin of the food they eat. Some contend that this is due to the shrinking number of
farmers. In 1961, the number of discrete farms in the United States was around 3.82 million while in 2001 that number was only 2.17 million. Additionally, a mere 2 percent of farms control 50% of all agricultural sales (Krebs, 2002). This story is verified by many different studies including those conducted by the National Research Council in 2002 which found that over time, smaller landholders are muscled out of the market and bought up by large farming empires and agribusiness corporations (Earl et al., 2002). Former farmers are forced to take new jobs, often in the cities or become tenant farmers on large corporate-owned agricultural properties—so-called “neo-plantations.” This is a classic example of the observed growing trend of urbanization. The consequence of a gradual tendency for increasing population in cities and decreased population in rural areas furthers the disconnect between the majority of Americans, who live in the cities and work in sectors other than agriculture, and the way that most food is produced. As generations pass, fewer and fewer people are involved in agriculture and the origin of food becomes a mystery to the average person.

Other critics argue that busier lifestyles and fast food only increase this distance between people and their food by making food something quick and eating almost a nuisance in the fast paced world of today. This view is a critique on more than just the food system, but it does demonstrate the kind of thinking that can lead to a general disinterest and obliviousness about the food one eats. A voluminous amount of controversial media such as the book *Fast Food Nation* and the documentary film “Super-Size Me” have been published recently concerning the health and environmental problems associated with fast food.
More central to this thesis however, is an entire body of literature that encompasses the theories and philosophies behind the sustainable food movement. The basis for this movement is eliminating negative externalities and expensive inputs from food production. This is a very mainstream environmental approach to the problem of the current food system. The “food security” movement takes it a step further by focusing on the food needs of primarily urban populations who do not necessarily have ready access to food networks and incorporating urban agriculture into the food system. Food security relates more closely to the environmental justice movement, which concerns itself with aspects of civil rights, social justice, and environmentalism. These are two distinct movements whose goals are not always the same and whose values do not always overlap. The sustainable food movement is more concerned with the long-term sustainability of the environment and public health as it relates to food production while the food security movement’s primary goal is ensuring a healthy, robust, and uninterrupted supply of food to all people (CFSC, 2003).

Sustainable Food

Even before the hornet’s nest of environmentalism Rachel Carson stirred up with her book, *Silent Spring*, in the 1960s, people were concerned about the complications with soil, water, wildlife, and public health that modern farming techniques produced. Doomsayers in the 19th and early 20th centuries eagerly pointed out that world population growth was very quickly catching up with world food production. Fear of a starving future spawned the Green Revolution, and thanks to a number of technological innovations such as fossil fuel-based fertilizers, a range of deadly pesticides, and high-
yield genetic engineering, crop surpluses increased dramatically. But in time, evidence began to accumulate showing that while these new methods were initially very successful, yields began to decline after the first few years and some disconcerting side effects were observed in the surrounding environment. Agricultural runoff containing fertilizers led to eutrophication in nearby water bodies. Pesticides killed far more than just the target species and the useful biotic aspects of farm ecosystems like pollinators, worms, and soil fungus disappeared. Resistances in pests built up after a few years of use and new pesticides had to be used, adding more and more poisons to the environment that killed all manner of wildlife. Monocultures, fertilizers, excessive irrigation, and over-tillage led to increasing topsoil loss, erosion, and depleted natural soil nutrients. Farm machinery, sprayed chemicals, and dust particles caused serious air pollution. A number of health problems among farm workers have been traced back to chemical pesticides and fertilizers.

The reaction to these findings has been a rethinking of the entire food production system. Some farmers have rejected the new industrial methods and looked to the past for ways to farm that coexist more harmoniously with the surrounding ecosystem. Old techniques, sometimes prehistoric in nature, provide clues from hundreds, even thousands of years of sustainable practice. People are trying to find ways to eliminate many of the harmful aspects of conventional farming and replace them with methods that can be applied indefinitely. This means finding substitutes for fertilizers, pesticides, excessive tilling and irrigation, genetic engineering, and most likely downsizing the average farm. The focus is on providing healthy food in a sustainable way.
Sustainable farming often means scaling back an operation so that careful attention can be paid to every acre. The interactions between crops and other aspects of the environment like soil, water, and biotic organisms become much more important to the continuing production of crops. Farmers develop tighter connections with local markets and do not rely on shipping their products over long distances. The effects of all actions on the environment, both locally and globally, are considered a central issue to sustainable farming.

**Food Security**

One of the major leaders in this movement is the Community Food Security Coalition (CFSC), based in Los Angeles. The coalition has hundreds of member organizations that share common goals. They sponsor programs including farm to school, farmers’ market outreach, training in food issues, policy development, and school gardens. Their mission is to promote community food security, defined as “a condition in which all community residents obtain a safe, culturally acceptable, nutritionally adequate diet through a sustainable food system that maximizes community self-reliance and social justice” (Hamm, Mike and Bellows, Anne, 2006).

CFSC relies on six central principles to achieve this goal. The key aspects of these are addressing low-income community food needs, strengthening the food system overall, developing a community’s infrastructure for supplying food to residents, encouraging the self-reliance of residents in food issues, creating stable relationships with local food sources, and utilizing interdisciplinary approaches to solving problems (CFSC, 2006). The comprehensive values of sustainable, local, and healthy food appear
throughout these principles, thus connecting them nicely to the goals of the sustainable food movement.

One particular area in which the sustainable food and food security movements differ is when decisions must be made between food which is more sustainably produced and food which is cheaper and more readily available. For many, the more sustainable option is inviting because it is likely to be healthier and more environmentally friendly. However, sometimes obtaining such food requires transportation over longer distances, higher prices, and they can be limited in availability to only a few stores or markets. For someone more concerned with food security, a better decision might be to select foods which are not necessarily produced as sustainably, but which are produced more locally, are cheaper, and are available at far more locations. This grants people of limited means more choice, more assurance of a consistent food supply, and perhaps the ability to buy healthier foods. Although sustainable or organic products may be all in all healthier, many low-income households will not buy them because they are expensive. On the other hand, if they are provided with fruits and vegetables which are cheaper, but may contain pesticide residues, they may, on the whole, be healthier because the nutrition provided by vitamins in such foods outweighs the harm caused by pesticides. Studies have yet to be done to weigh the importance of these different health effects.

**School Gardens as Federal Policy**

In 2004, Congress passed the Child Nutrition and WIC Reauthorization Act to amend the National School Lunch Act and incorporate aspects of the Farm-to-Cafeteria Act which never became a law itself. The purpose of this new statute was to “strengthen
nutritional service programs, promote healthy choices among children, and address growing concerns that the Federal School Lunch Program does not do enough to ensure free and reduced-price lunch benefits go to children who qualify” (Cochran, 2004). Among the provisions for improving diet, nutrition education, and physical education, the bill cited goals of strengthening partnerships between local farms, school gardens, and child nutrition programs.

A significant focus of the legislation was based around the idea of maintaining local control over food programs, but providing federal funding to aid the local implementers. To this end, grants were authorized under the Act of up to $100,000 for a single school as long as 25% of the funding for any project is provided for by other sources. More specifically, section 122, which merged with another section on school gardens, fosters a seed grant fund for Farm to Cafeteria project start up costs that include equipment, nutrition education, and school gardens (CFSC, 2005).

**A Garden in Every California School**

Although Delaine Eastin called for a garden in every school in 1995 by 2000, the policy did not actually pass through the state legislature until several years later. The School Instructional Gardens Program bill was signed by Governor Davis in 1999 to award grants to schools and other academic institutions “to establish school site gardens and incorporate agricultural, nutrition and integrated waste management concepts into classroom instruction” (California Department of Education (CDE), 2001). The bill outlined three goals:

1. To promote nutrition education and motivate students to make healthy food choices.
To promote waste management concepts by highlighting composting, vermicomposting, the waste management hierarchy and incorporate recycled content products at the school garden site and/or cafeteria.

To foster a better understanding and appreciation of where food comes from, how it gets from the farm to the table, and the important role of agriculture in the state, national, and global economies.

(CDE, 2001)

Funding was jointly provided in the form of grants by the California Integrated Waste Management Board (CIWMB) and the California Department of Education (CDE). Initial grants of $1000 were given to schools that approved garden programs and applied for the funding. These agencies also provided mandatory training for grantees to orient teachers to the program goals.

However, in 2002, the CIWMB’s budget was reduced and the school gardens program was dropped due to lack of funding. Fortunately, schools have taken up the call on their own and several organizations, especially the Western Growers Association and California Fertilizer Foundation, stand out as replacements for the state as grant givers. With their help, a great many more schools have begun to develop gardens for use in education and nutrition despite the failure of the state to continue their program with the same vigor.

**Western Growers Association**

The Western Growers Association (WGA) was founded in 1926 and serves as an advocate for producers of fresh produce. When the state stopped making school garden grants in 2002, the head of the California Department of Food and Agriculture requested
that WGA continue the mission of placing a garden in every California school. As a result, WGA created the Growing with Children Foundation to provide funding for school gardens in California and Arizona. They also make $1000 grants and, for schools that received funding from CDE between 1999 and 2002, grants are made on a basis of additional need. When I spoke with Kasandra Lovett, the School Garden Coordinator and Network Administrator for WGA on November 1, 2005, WGA had already funded 145 schools. Funding is not constant for WGA. Most of it comes from donations from farmers to WGA and is then allocated to the Foundation by board members. Some of the money is also received in the form of grants from the Department of Health (Lovett, 2005). It is nearly impossible for schools to get money from the state anymore because the Department of Food and Agriculture and the Department of Education do not have money in the budget for them.

Unfortunately, simply granting schools $1000 does not build a garden education program. There are many administrative, logistical, and motivational problems before a working garden program can be successfully developed. Initially, for a garden to become a reality, there generally, needs to be at least one very passionate and hard-working faculty member at the school. Without such a person, coordinating and developing the program is left to parents and community members who cannot work as effectively through the same channels. The next hurdle is the administration. Headmasters and school district administrators are typically skeptical about the role and effectiveness of school gardens and would prefer to use the necessary space, money, and time for other purposes. WGA spends a great deal of its time trying to prove that garden education programs are raising test scores because standardized testing matters so much to
administrators. Teachers also need to show administrators that they have lesson plans pre-prepared and incorporated into the curriculum before a school garden is approved. Simply obtaining the funding and information for starting a school garden program can be difficult even if it is approved because, currently, region-wide offices are not set up to handle some areas. If a garden is allowed, teachers need to demonstrate that it is helping children learn or the program may be abandoned.

WGA is concerned about a number of things in making grants for school gardens. What they have in common with administrators is a desire to see that the gardens are actually being well used and incorporated into the curriculum. If the garden is not being sufficiently integrated or the teachers and neighborhood residents are the ones primarily using the garden, then educational goals are not being addressed. Similarly, if the teachers do not have adequate resources or adequate knowledge to fully implement the program, then children are not receiving the opportunities they should. Addressing problems of knowledge and supplies is a major goal for WGA. They are currently trying very hard to see that specialists such as Master Gardeners are visiting the schools and helping teachers learn how to plant, irrigate, harvest, and generally manage the gardens correctly for students’ maximum benefit.

California Fertilizer Foundation

The California Fertilizer Foundation (CFF) is a non-profit organization that was begun in 1998 to fund all kinds of gardens. Most of their funding comes from fundraising events, grants from the federal government, and large fertilizer companies. There appears to be a conflict of interest in chemical fertilizer companies funding
supposedly organic school gardens, but CFF claims not to discriminate between organic and non-organic gardens’ requests for funding (Miller, 2005). Schools apply individually for $1000 grants once a year on the basis of merit. CFF currently distributes 24 grants a year to schools they believe are dedicated to fostering a successful garden education program. They are especially concerned with seeing that schools garner support for their gardens in the surrounding community, among parents, and local garden supply businesses, not just at the school itself. Additionally, at the end of every year, schools that receive grants apply for a progress grant and the winner receives an additional $1500 and a sponsored garden-related field trip for the children.

CFF has funded about one hundred schools and are very happy with the results. Sara Miller, the Director of Programs, told me that CFF believes “that teaching gardening to youth makes them better and more thoughtful consumers who will make more informed food choices as adults” (Miller, 2005). She also said that while $1000 does not seem like a lot of money, teachers are surprisingly resourceful and manage to stretch the money a long way. To aid them, CFF also provides educational materials such as garden education workbooks and course ideas.

Other Supporting Organizations

The National Gardening Association (NGA) has a number of grant programs funding a wide variety of school gardening applications. Under the Youth Garden Grants Program they disperse fifty $500 grants and one hundred $250 grants yearly, along with a variety of gardening publications and discounts. Twenty-five $200 gift certificates are awarded by the Healthy Sprouts Awards program and four other grant programs award
hydroponics equipment, rose gardens, Dutch Bulbs, and garden tools. Unfortunately for California schools, NGA is a national organization and these grants are spread out to schools across the nation, as well as a few non-school garden programs (NGA, 2006).

Lowe’s sponsors the Outdoor Classroom Grant Program for outdoor gardens. They too are a national program, but fund one hundred schools a year with grants of at least $2,000 and up to $20,000 for major garden projects. Viva!, which is sponsored by a number of agricultural businesses, offers fifty $250 Home Depot gift cards a year to schools all over the United States. The more localized Hanson Trust offers $30,000 worth of $750 grants for garden programs to any qualified school in Ventura County. Fiskar’s Project Orange Thumb offers grants of up to $1,500 worth of gardening tools and $800 of other gardening supplies to a number of different types of garden programs, not just schools. All of these organizations have an application process to demonstrate the worth and stability of the proposed project before funding is awarded.

The Funding Gap between the State and Current Funding Organizations

While these organizations are striving to fill the gap, the problem with them is that they can not replace the state’s vast financial resources. Teachers campaigning to start a garden program at their school often have to rely on more than these organizations to obtain the necessary funding, especially because there is stiff competition for it. This means a lot of time spent asking for donations from a variety of people and businesses who may share similar attitudes. Many gardens that already exist hold fundraisers to augment their supply of funds to keep the garden going. These include selling the products of the garden and auctioning off tours of the garden or dinners prepared with
garden produce. Admittedly, these are time and energy intensive events, and only the very dedicated teachers can pull them off successfully enough to provide for their gardens.
SCHOOL GARDENS IN CALIFORNIA AND A CASE STUDY OF SANTA MONICA/MALIBU UNIFIED SCHOOL DISTRICT

Current Status of California School Gardens

We can not be entirely sure how many school gardens exist in the state of California. The number is constantly growing, no recent comprehensive count has been taken, and the exact definition of “school garden” is somewhat contestable and illusory. One study, conducted jointly by UC Davis, the CDE, and Cal Poly Pomona in 2005, defines a school garden as “plants grown in the ground, in raised beds, in pots or in greenhouses in both classrooms and outdoors” (Graham et al., 2005). Based on their survey responses, they conclude that there are at least 2,381 schools in California with school gardens. In an article for World Watch two years earlier, Erik Assadourian cited the number 3,000 as those schools with gardens that have received some form of assistance from the state (Assadourian, 2003). This estimate of 3,000 is supported by an article released March 2006 by the CDE claiming that 3,000 out of California’s 10,000 schools have planted gardens since the advent of the Garden in Every School Program (McLean, 2006). Based on these variable estimates, we can assume that almost one third of the schools in California have a school garden. I find that to be a substantial feat, despite the fact that the initial program hoped to place a garden in every school. This is corroborated by the Graham et al. study which saw the increase from a 1996 analysis that found that school gardens were only present in 13% of California schools (Graham et al. 2005). Despite the loss of funding for the Garden in Every School Initiative, the CDE still views their work as a success and promotes the program as much as they can through start-up kits, curricula, and cooperative extension services.
Difficulties in Building a Garden Education Program

A number of research studies have been conducted on which schools have gardens and why. The initial problems are generally the toughest to overcome, as most schools lack the resources and knowledge to start a garden program. Research has found that the three most significant barriers to having a school garden were lack of funding, time constraints, and lack of gardening supplies (Graham et al. 2005). But there are other factors as well. A study done on school gardens in Las Vegas found the major reason for not having a school garden was lack of funding, but that other reasons included fear of vandalism, never considering a garden program, and lack of interest (O’Callaghan, 2005).

Most teachers in California are probably aware of the Garden in Every School Initiative, considering its publicity and the strong statewide push by many different entities to aid schools to such an end. However, 7,000 schools is a major task for non-government organizations to fund. If an interested and energetic teacher exists at a given school and they are able, before anything else, to secure space on school grounds for the garden, convince the administration that the garden is a worthwhile and beneficial endeavor, and muster up support from other teachers or volunteers, then the school might have a chance of obtaining funding to start the project. But a large number of schools are applying for a small amount of additional funding. WGA has only funded 145 schools in three years, CFF only funds 24 schools a year, and while the NGA funds more than 200 schools a year, the largest grants are $500 and they are spread out across the country. Excluding a handful of other small organizations, schools must try to convince the district to divert some of their tight budget to the project, turn to the Federal Government for
grants through the Child Nutrition Act, fundraise, or coax donations out of nearby businesses.

It is unusual for teachers to have the necessary gardening knowledge previous to the installation of a garden. Consequently, a great deal of information and technical support must accompany any funding for a successful project. The CDE, UC Cooperative Extension, WGA, CFF, and many other organizations offer plenty of instructional materials on all aspects of garden management and curriculum ideas for utilizing the garden for standard classroom subjects. Sometimes this may be enough, but more often than not, school garden programs benefit significantly through some form of extension services or the help of gardening specialists who visit the schools to further help teachers learn how to garden more effectively. UC Cooperative Extension trains Master Gardeners for precisely this purpose. These specialists take classes and then donate a certain amount of time, usually fifty hours, to receive their Master Gardener certification. They are not designated solely for school gardens, but lucky schools receive regular visits from them and some districts even pay to keep them on a permanent basis. One program, the School Garden Teacher Training and Support Project, set up by the Occidental Arts & Ecology Center (OAEC) near Santa Rosa, offers to help schools set up and sustain a garden through intensive teacher and volunteer training and follow up consultation. However, the OAEC requires a stiff payment of $350 per trained teacher and $250 per trained volunteer in addition to the purchase of materials (OAEC, 2005). The unfortunate aspect of such programs is that they tend to put wealthier schools at a great advantage, often times leaving behind those schools that need garden programs the most, especially in terms of food security.
Maintaining and Expanding a Garden Education Program

Once a garden has been created, supplied, and the teacher has learned the basics of planting, harvesting, composting, soil chemistry, irrigation, and other necessities, she must incorporate the garden into the curriculum and plan for its upkeep. Part of the problem for many public schools is that the curriculum is set by the state and the school district and administrators can be loathe to alter it for fear of not fulfilling state guidelines. This means that teachers are sometimes hard pressed for time in which they can teach garden subjects and that they must find a way to work the garden into the lesson plan without jeopardizing the standard curriculum.

Initial funding is usually necessary for the opening stages of a school garden program, but there are always costs of further sustaining the garden. Most of these costs are supply-related. The need for new seeds, new tools, new planting boxes, and new soil is ongoing. Without grants or funding, schools are forced to form relationships with local gardening supply stores for help. These connections are a very important part of the continuing existence of school gardens. But after funding, human capital may be the most important part of running a school garden program effectively. Graham et al. found that school principals strongly agreed that the most prominent resources in sustaining a garden consisted, aside from funding, of staff support, administrative support, time, parent volunteers, and a garden coordinator (Graham et al., 2005). Because of the labor intensive nature of much gardening and the consistent care necessary to keep a healthy garden, one teacher is usually not enough to hold the project together single-handedly. Teachers also have busy schedules. Their days are full, and if they do not have time set
aside for the garden on any given day, someone needs to fill the gap and that means, at the least, a volunteer, but preferably additional staff support and extension services.

One more aspect to consider is that many school gardens are quite small in scope at first. If the program remains stable after its inception and there are sufficient resources available, many schools consider expanding the program. Currently, most school gardens do not contribute significantly to the school meal program (Graham et al., 2005). Small gardens are unlikely to contribute much to the cafeteria and also limit the variety of applications possible in terms of education. Adding additional plots, planters, compost bins, or other facets to the garden offers increasing possibilities for education, nutritional improvement, and environmental understanding.

**Gardens in Santa Monica/Malibu Unified School District (SMMUSD)**

As mentioned above, the school gardens in SMMUSD were originally started by a UC Extension worker, Rachel Mabie. She was deeply troubled by seeing schools where there was little or no connection to the natural environment anywhere on school grounds. She was particularly concerned for those inner-city children who have few opportunities to experience the environment outside of school. Although she worked throughout Los Angeles, her Gardening Angels School Garden Program was especially effective in SMMUSD, most likely because of the extensive financial backing of the City of Santa Monica and the school district. She worked with teachers, volunteers, and administrators, and now, every school in the district boasts a garden (Savio, 2003). This is another feat worth applauding given the percentage of California schools with a garden is only around 30%. Although a number of schools received funding from the state and at least four
from CFF, most of the current funding for continuing these programs comes from the city of Santa Monica and the school district. The city and the district each give $750 a year, much of which goes to planting boxes. The SMMUSD garden program coordinator, Debbie Harding, has also managed to secure $500 worth of free seeds a year from the Master Gardening Program. When asked if there was a need for more funding, Debbie replied that she was very satisfied with the generosity of the city and the school district and just hoped that they would continue to support the gardens with the same commitment in the future.

Debbie works 15 hours a week. She visits every school in the district including the high school. She teaches gardening classes, manages the gardens, handles upkeep, and assumes general responsibility for the gardens. She is assisted by Conrad, an aging groundskeeper who works 30 hours a week, but as she politely informed me, he is beginning to slow down and is less energetic in his work than he used to be. Debbie is always trying to expand the program and is constantly installing new planting boxes or convincing Orchard Supply Hardware (OSH) or Santa Monica College to give her more soil, seeds, worms, and tools.

I spent an afternoon with Debbie touring several schools and their gardens to get a feel for the district-wide garden education program. Upon seeing the gardens, I was somewhat disappointed by what constituted a “garden” at some of the schools. I observed a class of first graders at McKinley Elementary learning from Debbie how to plant in raised planter boxes. McKinley has the largest garden of any school in the district with about twenty planter boxes, a small flower garden, an outdoor class area, two supply sheds, and some spaces for trees and shrubs. Each class has its own designated
planter box which they are responsible for planting, weeding, and harvesting in addition to any other activities for core subjects like math, science, or language arts.

But McKinley is lucky to have so much. Most SMMUSD schools, like SMASH Alternative School, have only a few planter boxes making up their gardens. John Muir Elementary has only two rows of smaller boxes. Santa Monica High School’s garden is luckily quite extensive. It has a small grid of planter boxes, a tree grove, and a greenhouse for conducting gardening and science experiments as well as storage. The high school is supposedly the next largest garden after McKinley. I did not see all the schools due to time limitations and the fact that most of the gardens are difficult to access, small, and, to be frank, unexceptional in appearance. For most of these schools,
the exceptional aspects of the gardens lie in the lessons that are taught and in the vegetables that the children eat.

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**Policy Goals for School Gardens**

The Garden in Every School Initiative encompassed a number of lofty goals at the outset with the belief that school gardens would rise to the challenge of meeting those goals. For the purposes of this thesis, I shall divide these goals into categories of educational, nutritional, and environmental. Below I will argue that, to a limited extent, these goals are intertwined and interdependent, but the argument can also be made that they are discreet and separate from each other. These goals nicely categorize the current theories behind the implementation of the Garden in Every School Initiative, but it should
be noted that the original goals were slightly different. This was due in a large part to the importance of the CIWMB to funding in the initial policy. The first project goal as defined by CDE and CIWMB in their “Scope of Work” can be definitively categorized as a set of nutrition goals, and the third goal relates primarily to agriculture and sustainable food education, both environmental goals, but the second goal which discussed recycling and waste streams is slightly different (CDE, CIWMB, 2001). Although this is certainly an environmental goal set, the focus is so narrowed and intensely stated that I would define a separate category for waste stream goals. However, since the demise of the CIWMB as a funding body for the policy, there has been a tendency to shift more and more focus away from waste streams, and far more of it towards education.

A major reason for this policy shift is that, with a shortage of funding, teachers and other parties interested in beginning school gardens have a more difficult time convincing administrators and other decision-makers in the education system that school gardens are worthy of time, money, and attention. Because these people with decision-making power are primarily in the education system, they tend to be most concerned with educational goals. This means framing the argument for school gardens in the context of improving test scores, increasing attention span, and general child well-being. As a result, a number of studies have been done on the role of gardens as learning tools in school settings. It has been demonstrated that using the environment as a contextual basis for education increases test scores, reduces disciplinary problems, improves student attitudes, and increases student attendance (Lieberman, 2004). These results have been duplicated by many other researchers. In 1999, the CDE commissioned their own study of the effects of the environment on education and found that 77% of students in
environment-based education scored higher than their counterparts and 84% had reduced attendance and discipline problems (CDE, “Creating a Healthy Nutrition Environment,” 2005). Two major studies conducted by the State Education and Environment Roundtable in 2000 and 2005 had similar findings in 12 different states (SEER, 2000) (SEER, 2005). Studies have also shown that improved nutrition improves student performance as well, and this too has been a selling point to administrators (CDE, 2005).

Knowing the focus of California school garden programs is very important to this thesis because I intend to draw the distinction between those aspects of garden programs which enhance the goals of sustainability in food and those that have a slightly different motivation. It should be understood from the outset, however, that gardens are established for many reasons, and that educational, nutritional, and environmental goals are usually a part of every decision to begin a school garden program. The prerequisites for starting a garden program are demanding enough on the part of most grant and aid givers that anyone hoping to undertake such a program must be well informed as to all the aspects of school gardens and their applications.

**Sustainable and Secure Aspects of Garden Education: Direct Effects**

The categories of goals can be alternately classified by their relation to the sustainable food and food security movements. Educational goals of the garden programs tend to produce few effects that can be recognized as benefiting either without something of a stretch of reasoning. Nutritional goals can be seen as benefiting these movements indirectly as they promote awareness and conscious eaters who are more likely to eat organically. Environmental goals have direct benefits for the sustainable
food movement. It might be argued that the benefits of better education can be found to indirectly lead to more intelligent and better reasoned human beings who are more able to make good food choices, but this appears to me to be an unsubstantiated argument when one considers the intent of the policy implementers with regards to educational goals.

The direct benefits to sustainable food are generally a result of environmental and sustainability goal sets and most are easy to characterize. The vast majority of school gardens in the state of California make an attempt to be organic, or, to escape the more recent connotations of organic as labeled by the USDA, sustainable. Chemical fertilizers and pesticides are avoided in favor of depending on natural systems to provide for the nutrition of the plant and weeding to deal with pests. Even in small beds, plants are usually intercropped to promote continuing soil nutrition and prevent the dangers of increased pest activity that go hand in hand with monocultures. Most gardens are too small to involve the use of intensive tillage procedures or heavy machinery so human labor must do most of the work.

One ideal quality of sustainable food and secure food that school gardens exhibit is local proximity. The food that they produce has no transportation costs attached to it. This eliminates the need for fossil fuel use and all the waste that is involved in packaging and shipping. Production and consumption occur in virtually the same location, thus eliminating the need for preservatives, other additives, and irradiation. The food is also fresher and healthier as a result. All these factors contribute significantly to establishing a more stable food supply that is proper for the consumption of all involved members.

The waste stream related goals as originally mandated are not as prevalent, yet they still play an important role in sustainable food production. The concept of the
garden as an ecosystem and thinking about all the inputs and outputs of the system is a core principle of sustainability. Most of the planting boxes at SMMUSD are composed of recycled plastic (hence their high cost). Those gardens that incorporating composting and vermiculture decrease the amount of waste they generate on school grounds and further enrich their gardens. The partnerships that gardens have with nurseries and other garden businesses encourage schools’ use of supplies and plants that otherwise would go to waste. Some schools even develop partnerships with graveyards to get extra soil.

The last point to make about direct effects is that teaching children to garden at school, if the program is continued for many years of their education, may make them lifelong gardeners. This would be the ideal result from the standpoint of sustainable food and the food security movement. When people grow some of their own food, they completely avoid most of the inherent problems with conventional agriculture and the modern industrial food system. Growing one’s own food also instills a sense of concern about food and the issues surrounding it. For some people who live in the city, this may be more difficult, but it may strengthen the urban food movement and the demand for communal urban gardens where people work their own plots of a larger piece of land.

**Sustainable and Secure Aspects of Garden Education: Indirect Effects**

The more indirectly beneficial effects of gardening on sustainable and secure food come from nutritional goals and a few educational goals. Improved nutrition itself does not necessarily help the missions of secure and sustainable food, but understanding what foods are nutritious and why can do something. Learning the value of whole grain products, fruits, and vegetables gives children more incentives to eat those foods and
negative incentives to eat foods high in starches, saturated fats, and cholesterol. Nutrition can teach the proven nutritional superiority of organically grown food over conventional foods (Asami et al., 2003). It also encourages providing diets that are more secure and increases demand for more secure foods. Such lessons encourage children to realize that there are more options than at the average supermarket and to consider those options.

Arguably the most important aspect of garden education programs for the purposes of sustainable food is simply teaching children about where food comes from and how it gets to the table. Too many children believe that food comes straight from the supermarket and even many adults do not understand the complexities involved in the modern food system. Because of the disconnect between people and food production, the major issues with agriculture and the differences between sustainable and unsustainable can be unclear or completely unknown. When children are educated about the environmental consequences of growing beef cattle in a concentrated animal feed operation, they may begin to think more carefully about whether they want a steak or a salad. Simply being aware of what food production entails makes people more conscientious about the food choices that they make. Understanding the complete process of bring food from the farm where it is grown and then processing it, distributing it, shipping it, and selling it gives a person more perspective on what they buy at the store or order at a restaurant.

When environmental education is included in the school curriculum, it can have a major impact. This means that children are learning about valuable environmental issues including sustainability, conservation, and pollution and how they relate to agriculture (Freeman, 2000). Hopefully, this knowledge will influence the food choices they make.
as they grow up and perhaps even those choices of the people around them. Environmental awareness naturally coincides with the principles of sustainable food and the connections between the two should serve to reinforce both.

In terms of secure food, indirect effects are not as prevalent. However, through nutrition education, children begin to understand the importance of secure food and the possibilities beyond the food system they are used to. Especially for those children who have never had the chance to go to farmer’s markets or have to depend on commodity food, garden education can be an eye opener. The differences may not appear immediately, but over time, students will begin to strive for more secure food for themselves and those they know.

Room for Improvements in School Garden Programs

As mentioned above, although SMMUSD has a cutting edge garden program that sets an example for the rest of the state, the gardens that I saw did not incorporate the concepts of sustainable and secure food as completely as I had hoped I would find. Recycled products and composting, for example, do not appear in current garden program documents, nor were they readily mentioned by the people I interviewed except for the recycled plastic planting boxes. Along the same lines, while environmental education is a part of many garden programs, it could be a much larger part of them. There is no section in the state garden curriculum guide for environmental or sustainability concerns, bits and pieces are simply incorporated into other units (Morris, 2001). Schools may decide independently to have environmental studies classes that utilize the garden, but it
would be more beneficial for the sake of sustainability to incorporate them into the state curriculum suggestions.

When a school does have a garden program, state guidelines often limit the amount of time that children can spend in the garden. Most other parts of the curriculum take precedence over garden education and the result is that garden programs are not as well integrated into the overall educational experience as they could be (Lovett, 2005). The focus is on raising test scores rather than on enhancing sustainable growing and eating.

Although they do not use chemical additives, the gardens do not incorporate all the sustainable agriculture principles. For one, the gardens in SMMUSD have significant pest problems. This is attributable to the lack of integrated pest management (IPM) techniques, the limited amount of dynamism in the garden ecosystems, and constricted and immature soil environments. These three qualities are interconnected. Without a larger ecosystem area to work with, IPM is difficult to implement because there simply is not enough room for all the species necessary for beneficial interactions. Virtually all the soil used in the SMMUSD gardens is purchased from nurseries or OSH. The consequence of this is that, while it may be enriched soil, the healthiest and best soils are those that have been developed in diverse ecosystems over time. Soil biota has not had time to build up. Planting boxes also restrict the amount of space so that biota within the soil can not migrate or diversify their environment.

There are a few other problems with planting boxes. Because they are so small, only a limited number of plant species can be grown in a given box, thus decreasing the benefits of intercropping and lowering the threshold for nutrient limitations in the soil.
One of the greatest benefits of gardens is that they rejuvenate soils and even purify them if there happen to be unhealthy substances in them such as synthetic chemicals or heavy metals. By removing a substantial portion of the gardens to these boxes, this valuable natural process is lost. Understandably, SMMUSD does not want the food their students eat to be contaminated with lead or some other poisonous substance and funding limitations prohibit the school district from taking the time necessary years for soil rejuvenation and instead installing the gardens in a manner that would enable their edibility immediately. And the soils in the area are contaminated by generations of urban runoff and pollution (Harding, 2005). Still, a sustainable food system means one that thinks of the future and serves to improve environmental conditions. Judging from the amount of inputs necessary for the current system, however, it appears that long-term goals of sustainability are being sacrificed to meet the limitations of funding and administrators.

Perhaps most notably, school gardens, on the whole, do not produce a great deal of food for consumption. This is a significant drawback in terms of food security, as the ready availability of food on site would afford a perfect opportunity for enhancing the sustainable food supply to all students. The gardens that I saw were all too small for the most part to truly make a difference in this category. Additionally, the focus on producing enough food to initiate real change in cafeterias is simply not there. Producing a lot of food is not a high priority. Education is. The food may be eaten, and so it has a small effect, but there is simply not enough room in the garden, nor is the program managed well enough to provide an amount or with the regularity and dependability that would have a significant effect.
The Garden in Every School Initiative has been very successful in some policy aspects, but not in others. Despite the fact that only about 30% of California schools have garden programs, more schools are getting gardens every year and those that have them are operating effectively enough to receive a great deal of positive feedback from all sectors. Publicity-wise, the policy is successful because it benefits so many at the expense of only a few grant-givers. Kids, parents, teachers, principals, food security organizations, and the state all love the progress that has been made in a few short years.

Part of the reason that there has been such a positive response is that some very serious concerns have been addressed, or appear to have been addressed. These concerns are predominantly nutritional; they are the primary reason that the policy was developed in the first place. Thus, when reports all say that children are eating vegetables they grow and learning more about nutrition, policy-makers can say that they are accomplishing what they set out to accomplish and parents rest easier knowing that their children have healthier diets.

But this is not a complete picture. Studies have shown that growing vegetables and eating them makes children more likely to eat those vegetables in the future. Nutrition education also has been demonstrated to enhance the diets of children. SMMUSD, for example, endorses the Five a Day program (five servings of fruits and vegetables a day) which they find to be reasonably successful. In this way, the gardens are helping a great deal to promote positive nutritive changes in children. However, I did find that while nearly all school gardens in California grow produce of some form, and that nearly always that produce is eaten by the children, most school gardens do not produce enough to significantly impact children’s diets or cafeteria offerings. Most
principals in California who work at schools with garden programs “deemed the garden as being not effective or slightly effective at enhancing the school meal program” (Graham et al., 2005). This was also determined to be the case at SMMUSD. Both Debbie Harding and Donna Richwine indicated that while all the food that was grown was eaten, most of it was not eaten in the cafeterias, but as it was picked, in special picnic events, or, in one case, it was sold to a local farmer’s market. These were presented as very rare events, happening only a few times a year at harvest time. The scale of most gardens is currently very small and therefore, there is not enough room to grow more food.

While growing a sufficient amount of food to supply cafeterias was not listed as initial goal on the part of CDE in the enactment of the Garden in Every School policy, it was incorporated into the Child Nutrition Act under the auspices of improving the School Lunch Program (Cochran, 2004). It has also been discussed as a major source of hope for food security and as a response to many of the problems with conventional agriculture and the current food system. In this regard, the gardens are, so far, something of a disappointment.
CONCLUSION: EVALUATION OF SUSTAINABILITY IN SCHOOL GARDEN PROGRAMS AND RECOMMENDATIONS FOR THE FUTURE

Inaccuracy in the Policy’s Implementation

It is clear that school gardens have been a relatively successful policy from the perspective of those entities and organizations involved. The accuracy and timeliness of the implementation, however, was substantially affected by the loss of CIWMB as a funding body, the influence of school administrators concerned primarily with academic performance, and the lack of expertise and specialized lesson planning on the part of teachers. The result is a policy that is no longer timely in implementation and only partially accurate with regards to the intent and message of the policy.

Timeliness has certainly been altered a great deal by the loss of state funding. The state has clearly not met Delaine Eastin’s goal of a garden in every school by the year 2000. Initially, the CDE and CIWMB met their guidelines of reviewing grant applications, distributing grants, and writing assessment reports (CDE and CIWMB, 2001). The result was that many gardens were funded and built. Since the loss of funding, those agency processes have ceased and the rate of increase in garden education programs has slowed substantially.

As noted above, although the initial policy goals of the Instructional School Gardens Initiative emphasized education on waste streams and waste management, that goal was distorted and minimized when CIWMB was no longer a part of the program. Some programs incorporate aspects of this part of the policy such as composting, vermicomposting, and using recycled products and schools that use the garden to teach environmental studies classes may apply these concepts. But the topics do not currently
exist in garden education curricula that I have examined nor have employees of funding organizations, teachers at SMMUSD, or others involved with the programs mentioned them. This component of the policy, then, can be said to have either been implemented inappropriately or largely ignored.

Another consequence of the decline in funding was that school administrators had about the same amount of money or less as before the policy was introduced and now they have an additional program to fund. Combined with their predisposition towards concentrating test scores as a measure of progress, their tight budget means they are less likely to approve garden programs, especially if they believe there will be no measurable improvement in students’ academic performance. When teachers and funding organizations tailored their garden sales pitch towards administrators’ desires, they committed to another error in policy implementation by focusing more of the attention on educational goals. These goals tend to be the enrichment of other subjects taught in school, which are not necessarily related to nutrition, education about the food system, or waste streams. While they do not exactly coincide with the purposes of garden programs described by CDE, they do represent a general public and educational sentiment for better schooling. Thus, although the policy was implemented differently than originally intended, unexpected benefits have developed in the eyes of all parties concerned with improving education.

The difficulty of installing a school gardens program has further delayed implementation and caused errors in the nature of that implementation. Without proper expertise, teachers may not be able to organize a working garden program or they may put together garden programs which do not conform to the vision of policy-makers.
Although the state tries to provide curricula that integrate the garden lessons into normal classroom instruction, teachers do not always have access to these.

**Accuracy in the Policy’s Implementation**

The most accurately implemented part of California’s school gardens program is probably the nutritional aspect. Gardens do not supply as much food as they could, but the food that they do supply is healthy, it is eaten, and it is used to teach children to like healthy foods like fruits and vegetables. Studies have shown that children who garden and are taught nutrition are more likely to try and to like new vegetables (Morris, 2001). The strong desire by both government and the public for healthier eating habits, especially among children, means that additional pressure is applied in this area of the policy and it is therefore more likely to be implemented accurately.

Debbie Harding sees a number of major successes at SMMUSD. The high school students she works with have been in garden education programs for years now and they really love gardening. This is clear evidence that the policy is accurately implemented with regards to teaching students how to garden so that they understand better the relationship between agriculture and the food on the table. She also sees children of all ages eating vegetables they never would have touched otherwise and enjoy doing so. She sees all students feeling better about themselves and happier as a result of the gardens. Many of these things may seem simple, but in her eyes, they really change lives.

The nutrition specialist for SMMUSD, Donna Richwine, agrees with Debbie on the effectiveness of the program. She described the district-wide program as a “huge success.” Although she felt that the program was stronger at some schools than others,
she had nothing but good things to say about it as a whole (Richwine, 2005). The teachers I spoke with at McKinley and John Muir described the garden program in similar terms. Miriam Hopkins, who teaches third grade at John Muir, said that the problems with the gardens were mostly due to limitations in scope, but she said that the program nonetheless made a big difference in the students and was instrumental in science classes (Hopkins, 2005).

State studies of school gardens throughout California are also positive. Graham et al. demonstrated that 69% of principals found gardens effective at enhancing their science programs (Graham et al., 2005). Both SEER studies also showed that gardens were contributing significantly to the betterment of education (SEER, 2000, 2005). Other state documents speak positively about the garden programs that have been installed already (CDE, 2005). Thus, the accuracies that exist have been found to be important to policy-makers, policy implementers, and recipients of the products of the policy.

**Hypotheses Correct/Incorrect**

To sum up, the Instructional School Gardens Program is being implemented more slowly than originally intended and some aspects are implemented more accurately than others. I found that I was correct in my hypothesis that nutrition would be given special attention among various parts of the policy and that as a result, more progress is being made in that area. As to the effectiveness of placing far more gardens in schools, the policy was effective at first, but has slowed down considerably and I found that my
hypothesis did not take into account the difficulties of designing and building a garden program without sufficient support and resources.

I was partially correct with regards to my hypotheses about the significance of certain factors to sustainable and secure food. Much of the significance with regards to the direct effects as a result of issues of sustainable food production and a reliable and sufficient quantity of food for the enhancement of security was blunted by the fact that gardens were smaller and less productive than anticipated. I did find that gardens do not practice many unsustainable methods and thus, relative to their scope of production, the organic effects on sustainable food are significant. I was incorrect, however, in supposing that there would be a reliable and abundant amount of food produced in the gardens. Most gardens are too small, not well managed, and as a result produce yields that are too low to have a significant impact on food security. I was correct in hypothesizing that the effects of waste stream education on sustainable food would not be significant. Without the influence of the state and especially CIWMB, there was less incentive or demand for waste stream education.

My hypotheses with regards to indirect effects were likewise only partially correct. Nutrition education was found to be quite important to most garden education programs and studies have shown that it has been significantly effective at improving diets. The significance for both sustainable and local food is high for this hypothesis. Education with regards to the food system was not as prevalent as I hypothesized. The educational goals of administrators were influential enough to alter the track of many garden programs such that the focus is oriented more specifically on more mainstream educational categories.
My last hypothesis was not shown to be particularly correct. It is true that some aspects of garden education programs are affecting sustainability and security of food more directly than others, and that funding does have a significant impact on the quality of a garden education program, but even in the well-funded schools, environmental considerations such as these are not given the same weight in the curriculum that I had imagined.

**Suggested Improvements**

There is always room for improvement. The most obvious comment in this vein is that we should continue carrying out the vision of Delaine Eastin to place a garden in every school in California. That means 7,000 more gardens, and 7,000 gardens means a lot more support, both financial and informational. At the moment, the most important services the state provides are largely informational: cooperative extension services and information on starting and maintaining a school garden. It is essential that this expertise continue to reach the schools. “Volunteers are great, but what we really need is people like Debbie [the garden program coordinator for SMMUSD]” said Miriam Hopkins when asked about the important aspects of the program. The experiences of the workers at WGA and CFF are also that teachers really need help with managing the gardens appropriately. It was found in surveys that there is a real need for curriculum materials and teacher training (Graham et al., 2005). That being said, funding is a crucial part of any policy and the state could begin to affect change quickly once more if it was willing to put up some grant money so that those schools which are not located in wealthy cities like Santa Monica can have a better chance at building garden programs.
The potential is there for school gardens to become much more important to the meals children eat at school and therefore to food security. It has been well demonstrated by Alice Waters and the Edible Schoolyard at Martin Luther King Jr. Elementary in the Bay Area. Countless writers and journalists have championed her efforts at intertwining the garden and the cafeteria as a huge success. There is no reason that other schools can not do the same. The barriers may be difficult, but they are by no means insurmountable. Funding and dedication seem to be what is lacking.

The Instructional School Gardens Program has been much more accurately implemented in educational terms. It was found that school gardens are predominantly used for the enhancement of academic instruction above all else (Graham et al., 2005). Indeed, the political pressure on the gardens from administrators has turned the focus in that direction, sometimes at the expense of other possible applications. When it comes to the core academic subjects such as science, math, and language arts, the principles taught in a large, diverse garden grown in the natural soil environment can just as easily be taught in a 4 X 8 foot planting box. Therefore, there is little incentive for those concerned primarily with academics to further enlarge and improve a small garden when doing so will not proportionately increase test scores.

The truth is, though, that small planters do not afford the same connection with the environment and the larger and more diverse a garden, the more that can be learned from it. They do provide a unique opportunity for education and have been shown to improve nutrition as they are, but their scale is such that no major and immediate benefits can be seen in the campaign for more sustainable food. If planters were eliminated in favor of gardening directly in the ground on site, overall inputs would decrease in the
long term despite the necessary start up costs of time lag for the garden environment to improve sufficiently for maximum benefits to sustainability, nutrition, and education. This is further evidence that both lack of funding and administrative goals are distorting the initial policy intent during its implementation.

I should mention that I do not advocate the goals of sustainability, security, or nutrition over those of education. To place one goal set hierarchically above another would be a matter of opinion. Even arguing that improving education, nutrition, and sustainability are mutually exclusive would be difficult, especially in the case of garden education programs. Evidence in too many studies has shown that all these goals are related to each other (SEER, 2000, 2005). The challenge then, is to find a way to combine education, nutrition, and sustainability in a way that enhances all three.

Without a state funded mandate or increased support from school administrators, improving school gardens involves a lot of hard work. If the state were somehow able to rejuvenate the program and offer funding once more, teachers would be able to more easily eliminate some of the barriers to having and sustaining a garden so they could concentrate more narrowly on what they were trained to do: teach. The technical and informational support can only help so much without the money to run the program.

**Good Signs for the Future**

In spite of the aforementioned improvements which should be undertaken, the California garden education policy has thus far provided substantial gains and promises to continue on track towards increasing those gains. Garden coordinators are learning all the time how to manage the program more effectively. Every year, more teachers are
trained in gardening and more schools get supplies and funding. And, of course, everyday children who are lucky enough to go to school where there is a garden are happier, eat healthier, perform better, and learn more about the food system. This generally positive response in and of itself further encourages the continuing implementation of A Garden in Every School because people feel that it is working.

Conclusion

A major issue with solving environmental problems in the world today is not the scope of the problem or lack of technology, but simply a lack of will to act because environmental problems are viewed by many as several steps removed from human beings. Many people believe that environmental policy concerns itself primarily with preserving National Parks and saving endangered species from extinction for their intrinsic worth. It is uncommon to find people who believe that the caring about the environment directly affects the well being of people.

From this perspective, creating school gardens is one environmental policy initiative that enjoys success because it relates so directly to humans, and especially children. The public tends to be especially sympathetic towards policy aimed at enhancing the lives of children. School gardens may also escape the label of “environmental” because they address a diverse array of issues. In an age of increasing incidence of obesity and related diseases, the health benefits from teaching nutrition are very important on a national scale. Likewise are improvements in many aspects of education. If these can be combined with environmental goals by using sustainably
managed gardens and secure food, the policy additionally addresses problems with the structure of the current food system.

I set out to discover what role school gardens are playing in addressing the mission of sustainable and secure food and I found out that while they are not living up to their potential in that regard, they are fostering a number of other very important societal aspirations. Improved nutrition and education can make a big difference in the lives of many children. The importance of these benefits can not be overlooked and should be encouraged. With continued support and additional funding, the policy could broaden the scope of its current effects and contribute more considerably to sustainable and secure food. Good foundations such as keeping the gardens organic and promoting growth are already in place. The atmosphere is ripe for a heavy push in that direction, which, if strong enough, would simultaneously advance and incorporate every goal of this program.
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APPENDIX A

List of Acronyms

CDE – California Department of Education
CFF – California Fertilizer Foundation
CFSC – Community Food Security Coalition
CIWMB – California Integrated Waste Management Board
IPM – Integrated Pest Management
NGA – National Gardening Association
OAEC – Occidental Arts & Ecology Center
OSH – Orchard Supply Hardware
SEER – State Education and Environment Roundtable
SMMUSD – Santa Monica/Malibu Unified School District
UC – University of California
USDA – United States Department of Agriculture
WGA – Western Growers Association
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