"Things need to change around here." The Diversification of a Small Farm in Northwest New Jersey

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“Things need to change around here.”

The Diversification of a Small Farm in Northwest New Jersey

An Environmental Studies Thesis Submitted in Partial Fulfillment of the Requirements of a Bachelor of Science Degree at The University of Vermont

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Abstract

In the face of rampant food illiteracy and the steady decline of small farms in America, many organizations, schools, and farmers are working to develop creative solutions to these problems. From Farm-to-School partnerships to civic agriculture, farmers are getting involved in their local communities. Through this involvement farmers are providing educational and social benefits to those who visit their farms, with the added benefit of diversifying their livelihood. This case study documents and evaluates the measures taken by Stephens Farm, a small Certified Organic family farm, to strengthen its livelihood. The initial goal of this project was to establish and evaluate a farm-based experiential education program on the farm to increase the food and agricultural knowledge among both the youth and their families within the local community. The ultimate goal of this project was to qualitatively evaluate how the diversification of the farm business affects its social and economic capital, and to incorporate the successful components of diversification into the farm’s future business plan.

KEYWORDS: Farms, food, diversification, livelihoods, education, social capital
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Introduction

If there is one thing that connects all of humanity, it is that we all must eat. Not only is food a source of physical nourishment, it is also a way of learning about, preserving, and enhancing culture. However, in American society there is a growing disconnect between people and their food, as industrial practices and standardization have pushed many small farms out of business. Unless changes are made to our food system and how our children are taught about their food, an integral part of American culture, the family farm, may very well disappear.

To counter the food insecurity, food illiteracy, and decline of small farms in America, a variety of organizations have set out to create programs that bring communities and farms together. Through farm-to-school programs and community-supported agriculture, many Americans, particularly children, are being brought closer to their food system and learning about agriculture and the work that goes into putting food on their plates. This partnering of farms with communities not only holds the potential to teach people about where their food comes from, but also to open up a variety of niche markets for small- and medium-scale farms.

Along with opening new markets unique to their farm, many small farm businesses are making an effort to improve the functional diversity of their farm system. A diverse farm is made up of a number of multifunctional components that build redundancy into the system to guarantee that the failure of one entity does not lead to the failure of the entire system. In simpler terms, a more diverse farm is more resilient to change, and therefore is more likely to sustain the farmer’s livelihood into the future. There are a number of strategies to diversification, each with its own benefits. Some farmers plant a greater variety of crops, others begin raising different types of livestock, and some focus on producing value-added products. The most important
aspect of diversification, however, is the accumulation of social capital. Without community support or effective marketing, a farm business will struggle to make ends meet.

Growing up on a small family farm, I know all too well the struggles that are facing family farms. In my twenty-one years as a farmer’s daughter, I have experienced drought years, wet years, lean winters, bumper crops, crop failures, livestock births, unexplained livestock deaths, a tractor fire, and so much more. Throughout these experiences, both good and bad, my father would always say that things could be a lot worse. At least we were still able to do what we loved. In the recent past, however, things have gradually become worse. Of the problems that Stephens Farm is dealing with, some of the key issues are: a massive debt to the Farm Security Administration; we have not found a Certified Organic creamery to pick up our cows’ milk; the tractor was out of commission for the entire summer; and our customer base is dwindling. In addition, my father was diagnosed with Multiple Sclerosis. After years of saying it half-seriously, it has become apparent that, finally, “things need to change around here.”

This need for change was what brought me home to New Jersey this past summer to conduct a case study of my family’s farm. The purpose of this study was to determine what effects, if any, increasing the diversity of Stephens Farm would have on the farm’s economic and social capital. With this project I hoped to find ways to diversify the farm that would allow it to be a self-sustaining entity so that my family would not have to take jobs off the farm. Additionally, to help my father in the future, I wanted to explore options that would generate income for the farm, but that required less physical exertion compared to activities such as making hay. Ultimately, this project was focused on improving the diversity of Stephens Farm in a way that would improve its social capital and sustain it well into the future. The strategies that I used in this study were focused on increasing the farm’s social capital through an on-farm
education program and the sale of a more diverse array of products. The final product was a polished business plan delineating the mission, goals, and future plans of the farm to keep it on track in the coming years.

Every farm has features that make it unique from other farms. As such, this case study may not be directly relevant to other small farms in the United States. However, in my review of the literature there were very few studies available that detailed ways in which small farms were working to improve their resilience and economic viability. Based on the lack of information available, the steps and processes that Stephens Farm went through to pilot test an on-farm education program and to research ways to diversify the farm could be useful to individuals interested in learning about how other farms have been working to enhance their resilience. For some, my trials and tribulations with this project may help them to decide what the best direction for their own farm will be. It is my hope that my documentation of the diversification process on my own family’s farm will serve as a stepping-stone for other small family farms that are in need of a new direction.
Review of the Existing Literature

Faced with tough economic times, many small farms in America are experimenting with ways of diversifying their markets and livelihoods. A method that has been gaining popularity is the integration of agriculture and education in on-farm education and farm-to-school programs. Farm-based education holds the potential to broadly impact how small farms function, as well as how communities perceive and learn about food and farming. With my own family’s farm, I tested this combination of farming and education to evaluate how it might affect the social and economic capital of our farm. In this literature review I have first outlined background literature on strengthening rural livelihoods, followed by an overview of how the United States has arrived at its current food system model. Then I have reviewed literature about educational approaches, including farm-to-school education and place-based education. This review also includes a section on resources specific to curriculum development and evaluation, which will be a component of my methodology.

Farms and Food

In a nation built on agrarian values, a discussion of rural livelihoods and the food system is necessary to understand how the agrarian way of life has changed in the United States since the dawn of industrialized agriculture in the middle of the 20th century.

Rural Livelihoods

Rural livelihoods have become the focus of a number of organizations across the world, as globalization and a variety of other factors are impacting rural economies. Drawing from the works of Ian Scoones (2009), and Yuichiro Ameekawa et al (2010), I define a livelihood as a way of life that provides a person with the resources he or she needs in order to obtain the basic
necessities in life. It is also an essential part of a person’s self-identity and contributes to his or her overall physical, social, and emotional well-being through the generation of various forms of capital, from monetary capital to social capital. Social capital, as defined by Putnam, is the usefulness of your social network to yourself as well as your surrounding community, with the expectation of eventual reciprocity for your contributions to the network (Putnam, 2000). Using a livelihoods perspective for research is ideal in rural contexts due to its interdisciplinary nature and its ability to move across sectoral boundaries. In addition, a livelihoods perspective places an emphasis on improving the sustainability and resilience of a system by reducing its vulnerability to shocks and stresses in the system (Scoones, 2009). This may prove to be of particular importance in regions of the world where changing weather and land use patterns can have broad impacts on those living in the region. This perspective also has a number of shortcomings, such as: too little involvement with economic globalization; the failure to acknowledge the power and politics that influence livelihoods; lackluster attempts to address the change in environmental conditions that will be brought about by climate change; and finally, the failure to analyze debate about long-term shifts in rural economies and agrarian change in general (Scoones, 2009). Regardless of these shortcomings, the livelihoods perspective continues to be promoted by researchers for its unique lens of analysis. It is through this lens that I conducted my own investigation.

A field that has taken the lead in researching rural livelihoods is agroecology. According to Lovell et al. (2010, 328) agroecology “developed as an alternative to industrial, high external input agriculture and uses ecological principles to guide the design and management of agroecosystems.” The key components of agroecology are its focus on the use of traditional practices, as well as the use of the natural ecosystem as a source of knowledge. A good example
of an analysis of the relationship between agroecology and livelihoods can be found in a study conducted by Lovell et al. (2010). In this study the researchers created an evolving framework for multifunctionality assessment (see Figure 1), and also examined ways of measuring and examining the ecological, economic, and social impacts of an agroecosystem. The framework developed in this study is useful for evaluating the multifunctionality of farms before and after the addition of design elements, and because it is flexible it can easily be modified to evaluate specific areas of the farm at a higher priority than other areas.

*Figure 1 can be viewed in the print copy of this thesis at the Environmental Program Office.*

Figure 1. (From Lovell et al., 2010) This diagram shows how multifunctionality and agroecology are integrated to design an agroecosystem.

One of the defining features of agroecology is its emphasis on increasing the multifunctionality of an agroecosystem. Multifunctional agriculture (MFA) integrates the production of agricultural goods with the protection and enhancement of ecosystem services, and “develops a complex land-use and land-cover strategy that can meet multiple human needs from diverse ecosystems” that are sustained across a number of generations (Jordan & Warner, 2010). An MFA approach allows for the creation of “virtuous cycles of rural development,” developing synergies between the natural, human, cultural, political and economic assets of a rural community. It has been suggested that increasing the multifunctionality of an agroecosystem will build and increase the resilience of rural livelihoods. Due to its interdisciplinary nature, MFA requires new ways of obtaining knowledge, such as collaborative social learning, which involves a diverse array of stakeholders partaking in participatory research (Jordan & Warner, 2010). Conducting a case study in partnership with my family is one of the key strategies that I used to evaluate and improve the multifunctionality and diversity of our farm.
Despite the efforts of agroecology and other movements to protect rural livelihoods, the plight of the American farmers is at best described as bleak. Since the end of World War II, the number of farms in the United States has been in a steady state of decline, and between 2007 and 2009 fell by nearly 5000. “In the United States less than two percent of the population is employed in farming, and the federal Census Bureau has declared the number of family farms ‘statistically insignificant’ and no longer gathers statistics on them”(Kalb, 2006, 27). In addition, the 2007 Agricultural Census found that, of the 2.2 million farms operating in the United States, over 1.2 million farmers must use non-farm sources of income to sustain their livelihood (USDA 2007). With the urban renewal and suburban sprawl after World War II came the disappearance of representations of local food systems, such as small family farms, farm stands, markets, and public gardens. This decline in visibility of the food system has led to the loss of the once-common knowledge of where food comes from and how it is grown. (Nordahl, 2009). An interview with Pedro Magaña, a leader with The National Union of Autonomous Regional Peasant Organizations (UNORCA), characterizes the plight of the American farmer from the perspective of an outsider looking in. He commented that:

I believed that American farmers were super producers, that they were doing really well, they had the best, an organized development superior to ours. Now I know this is not the case…They have lost the quality of life. Today a farmer must work 14 – 15 hours a day… they are living on credit. Often they lose the land. Their children do not work the land, they have to leave. They’ve lost the community life. The quality of food is seriously questioned because of the high use of chemicals and hormones. The suicides of American and European farmers is a daily occurrence. (Desmarais, 2007, 28)

The American farmer’s quality of life is in a state of decline that is not likely to change unless some attention is given to reevaluating the American food system to meet the needs of both the consumers and the producers.
The Food System

Although at a glance our food system seems to be well functioning and viable, the decline of farmers and the health of our nation speak otherwise. The problem may be that our current food system is dominated by a paradigm of what Alice Waters calls “fast food values” that are affecting human health and the health of the environment (2005). From the idea that food is cheap and permanently abundant, to the belief that food is about fueling up as quickly as possible, these values are skewing our perceptions of the current food system and could have broad implications if some “slow food values” are not brought forward into society (Waters, 2005). The past 30 years have made it apparent that something has changed in our food system, as the percentage of children who are overweight in the United States has now doubled to 30.3 percent (Kalb, 2006; Stone, 2009).

What many are calling for is a new agricultural paradigm that recognizes that the health of humans and of the environment is more important than industrialization of the food system. For example, despite the arguments that organic and biodynamic could not meet the current demand for food, researchers have noted that small-scale, diversified farms, when managed properly, are more productive and economically viable than large-scale conventional farm systems. “In the United States the smallest two-hectare farms produced $15,104 per hectare and netted about $2,902 per hectare. The largest farms averaging 15,581 hectares, yielded $249 per hectare and netted about $52 per hectare” (Altieri, 2009). It has also been suggested that the stewardship of farmland makes rural landscapes more desirable and may also expand the scope of available markets to include local institutions. These new markets could help to strengthen farmer livelihoods, keeping them in business, and reducing the distance our food has to travel (Schafft, Hinrichs, & Bloom, 2010).
An issue more important than crop yield is the availability of local markets to these smaller, more productive farms. That is where civic agriculture comes into the equation. Civic agriculture is “the emergence and growth of community-based agriculture and food production activities that not only meet consumer demands for fresh, safe, and locally produced foods, but create jobs, encourage entrepreneurship, and strengthen community identity” (Lyson, 2004, 2). Civic agriculture can be organized in a variety of ways, from farmers markets and community gardens to community-supported agriculture, all of which have been shown to be on the rise across the United States (Hinrichs, Gillespie & Feenstra, 2004; Nordahl, 2009; Lyson, 2000).

Lyson writes that:

Communities that nurture local systems of agricultural production and food marketing as one part of a diversified economic development plan can gain greater control over their economic destinies. They can also enhance the level of interaction among their residents in order to contribute to rising levels of civic welfare, revitalize rural landscapes, improve environmental quality, and promote long-term sustainability. (Lyson, 2000, 44)

Not only does civic agriculture help farmers, it also helps the surrounding community, as the goals of productivity and efficiency at minimum cost are traded for social capital and economic autonomy. One of the tools that Lyson recommends for a move toward a more civic agriculture is the use of educational programs at schools and on farms to increase the agricultural literacy of children and adults alike (2000). In addition to helping small farms and food enterprises become independent from the mass marketing of conventional agriculture, civic agriculture also promotes social learning between producers and consumers, giving visibility to the practices and motivations of the enterprise, as well as stimulating marketing innovation (Hinrichs, Gillespie, & Feenstra, 2004). In 1987, the World Commission on Environment and Development defined the three objectives of sustainable agriculture: “economic profitability, environmental responsibility, and social equity” (Wynne, 2006, 226). Wynne claims that civic agriculture both meets and
exceeds these objectives, as it increases a community’s sense of social responsibility and civic engagement (2006). Civic agriculture also has a positive effect on community food security, as well as food literacy.

Food security, as defined by Hamm and Bellows, is “a situation in which all community residents obtain a safe, culturally acceptable, nutritionally adequate diet through a sustainable food system that maximizes self-reliance and social justice” (Izumi et al, 2006, 169). The issue of food security has become increasingly important in recent years due to the present economic recession. Families across the United States are now either reducing the size of their meals, or even forgoing meals, to make ends meet, which can have broad implications for their health and that of their families (Nordahl, 2009). Food banks across the nation have seen a 15 to 30 percent increase in demand for food assistance since the recession began, and these numbers are still rising (Nordahl, 2009). As a result of this widespread food insecurity, many schools are working to make the meals that they serve more nutritious and appealing to guarantee that at least some of the nutritional needs of their students are being met (VT-FEED, 2011).

In addition to the rising levels of food insecurity in the United States, food literacy has become a prominent issue. Considering the agrarian past of American society, it is hard to believe the rates of food illiteracy in this nation. Although the current food system in the United States has the benefits of convenience and year-round availability, it has been found to be problematic that a by-product of this food system is a total lack of the once-common knowledge about our food and how it came to be on our plates (Ableman, 2005; Nordahl 2009). Even those living in rural areas are not necessarily more aware of food than those in urban areas. In some cases they may be less knowledgeable. In Public Produce (2009), Nordahl writes about how he had “worked with a young woman from rural Iowa who had never tasted eggplant, and admitted
she probably would not be able to recognize one. (Eggplant, incidentally, grows quite well in Iowa.)” (11). In another instance, students were on a tour of the Davenport conservatory and a “child asked if the small oranges on a tree in the grow house were pumpkins or watermelons” (Nordahl, 11). Even vegans are not safe from food illiteracy. A vegan acquaintance of Nordahl illustrated this point with her explanation that “she could not have coconut milk because she gave up meat and dairy in her diet” (Nordahl, 2009, 11). Educational programs may be the key to reversing this trend and helping Americans relearn what their food is, recognize edible plants, and teach us how to take care of and harvest our own food (Nordahl, 2009). Nordahl also notes that children are the most important group to teach food education, because food literacy is like language: “most effective when it is taught at a young age” (2009, 129).

**Education**

“Education is no guarantee of decency, prudence, or wisdom. More of the same kind of education will only compound our problems.”…”It is not education, but education of a certain kind, that will save us.” (Orr, 1994, 8)

**Place-based Education**

Place-based education is the “pedagogy of community,” the reintegration of the individual into their home ground, and the restoration of the essential links between a person and her place (Orr, 2005). Place-based education (PBE) curricula can vary greatly in design and application (what Orr calls “curriculum speciation”), but the environment is always the primary integrating context of the curricula. In Beyond Ecophobia, Sobel fears that the current approach of teaching environmental issues may be distancing children from the natural world, rather than bringing them closer to it, as they try to cope with the numerous issues our world is facing (1996). “Developmental appropriateness” is something that tends to be a missing factor in environmental curricula (Sobel, 2005). Often topics are introduced before a child is developmentally prepared
to learn them, and this leads to phobias of math, science, writing, or even ecophobia, which is fear of the natural world. Some educators, as noted by Sobel, push for teaching the “here and now” – involving the surrounding natural area and community – before moving onto the abstract idea of “long ago and far away” to take into account, and better align the curriculum activities with, the point in the children’s cognitive development (Sobel, 1995). One of the examples that Sobel uses to illustrate children’s attempts to bring the local and global together was that of an eight-year-old girl who created a sign: “SAVE THE ELEPHANTS. DON’T USE IVORY SOAP.” The question is, should children be concerned with the plight of the elephants at the age of eight, or should they be more concerned with their own backyards?

To avoid fearfulness and a sense of disempowerment, Sobel suggests that educators foster a love of the natural world before they teach their students the threats facing the environment (Sobel, 1995). He outlines a strategy in which the curriculum first fosters empathy for the natural world during early childhood, then exploration in the middle school years, followed by social action during the high school years. Perhaps one of Sobel’s best-known ground rules is: “NO TRAGEDIES BEFORE FOURTH GRADE,” meaning that we should work to limit children’s exposure to large, complex problems that are beyond their scope of thinking to avoid the development of ecophobia and other emotional issues (Sobel, 1995). Place-based education is also a contributor to the movement for sustainable education. In the context of sustainability education it is focused on interdisciplinary, localized learning that is both personally relevant to the learner and that contributes to the vitality of the surrounding community (Stone, 2009). Our society tends to be very mobile, moving from one place to the next without much consideration. This leaves us feeling disconnected not only from a landscape, but also from the systems that sustain us (Orr, 2005). When students learn about their place they become more connected to the
world around them, and more conscious of the broader impacts of their activities.

**Sustainability Education**

The Tbilisi Declaration of 1977 is one of the most important documents to the development of environmental and sustainability education movement. Not only did it define the goals, objectives, and guiding principles of environmental education, it also outlined the primary objectives of environmental education: awareness, knowledge, attitudes, skills, and participation (Hungerford et al., 2005). Sustainability education (SE), or education for sustainability, is a new branch of environmental education, created in response to the perceived shortcomings of environmental education (Sterling, 1996). The definition of SE is extremely varied and somewhat complex, with a number of characteristics that will differ depending on whom you choose to ask. According to Sterling, SE is characterized by the fact that it is contextual, innovative and constructive, focused and infusive, holistic and human in scale, integrative, process-oriented and empowering rather than product oriented, critical, balancing, systemic and connective, ethical, purposive, inclusive and lifelong (Sterling, 1996). The schooling for sustainability movement has no central organization or structure; the constant of the movement is its diversity (Stone, 2009). The guiding principles for sustainable schooling are: nature is our teacher, sustainability is a community practice, the real world is the optimal learning environment, and sustainable living is rooted in a deep knowledge of place (Stone, 2009). Many see sustainability education as a necessary component of a curriculum if we are to meet the needs of our children and our future. In *Earth in Mind*, David Orr follows his discussion of the myths of education with what he believes the six basic principles of education are:

1. All education is environmental education
2. The goal of education is not mastery of subject matter, but mastery of one’s person
3. Knowledge carries with it the responsibility to see that it is well used in the world
These principles can serve as guidance for environmental educators, as well as for sustainability education.

Another key piece of sustainability and place-based education programs is systems thinking. In *Thinking in Systems: A Primer*, Meadows outlines a Sufi teaching story about a number of blind people who try to determine what a large object, an elephant, in front of them is. Each person reduces the elephant to its individual parts, and does not truly understand the functioning of the whole (Meadows, 2008). Although there are a number of systems and functions present in the elephant, we cannot forget to acknowledge the interconnectedness between the systems. Additionally, living systems are nonlinear, meaning they don’t maximize variables; they optimize them (Capra, 2005). We need to shift our perceptions in so many ways, from the seeing the parts to seeing the whole, to the movement from valuing quality over quantity (Capra, 2005). Building resilience into a system, be it an economy or a classroom, is essential to the functioning of the system. To keep a system resilient we need to, among other things, get the beat of the system to understand what keeps it going, pay attention to what is important – not just what is able to be quantified, locate responsibility in the system, and maintain the goal of goodness (Meadows, 2008). In sustainability education, the real basics of the system are: experiencing the natural world, understanding how nature sustains life, nurturing healthy communities, recognizing the consequences of how we feed ourselves and provision our institutions (Barlow, 2009). In the preface of *Ecological Literacy: Educating Our Children for a Sustainable World*, a teacher from a school gardening program spoke of using the SE approach in a garden setting: “You can teach all you want, but being out there, growing and cooking and
eating, that’s an ecology that touches their heart and will remain important to them throughout their lives” (Capra, 2005, xv). In 2002 a Canadian non-profit established a food-based program to examine the most effective method of teaching children environmental topics. One of the emergent qualities of the project was the presence of “farm friends,” older men and women, many of whom are retired farmers. It was found that the presence of these older farm friends and the development of intergenerational connections was what made the experience meaningful for the majority of the students (Mayer-Smith, 2008). The purpose of sustainability education (SE) is to create lifelong learners who are aware of their local ecology and the systems that they are a part of, such as their local community.

Farm-to-School and Farm-based Education

As sustainability education has become more common in school systems across the United States, many educators have found that food is an effective medium for implementing sustainability education curricula. This is done primarily through school gardening programs and farm to school programs. In a time when both schools and agriculture are being treated more like factories than meaningful institutions (Ableman, 2005), it is important that a child’s sense of wonder is preserved. An easy way for teachers to do this is through school gardens, which are relatively low cost and easily integrated into the existing curriculum (Ratcliffe et al., 2009). In the preface of Smart By Nature Barlow notes how when working in school gardens: “Children’s sense of wonder awakens as they find life teeming in a handful of soil or nurture a seed into a healthy plant to be harvested and enjoyed in a delicious meal with their classmates” (2009, viii). A survey conducted by Graham et al. (2006) found that most schools with school gardens use them as an enhancement to instruction. However, there is still a lack of curriculum materials to better incorporate school gardens into the curriculum (Graham et al., 2006). Research has also
suggested that school gardening would have broader impacts if more class time were spent in the
garden, and if parents and the community were involved in the learning experience (Ratcliffe et
al., 2009). In a study of agriculture education in Israel it was found that the incorporation of
farming issues into the curriculum and learning materials is fairly limited. Additionally, although
agriculture is referenced during the elementary years, it is mentioned sporadically at best through
the middle school and high school years (Tal, 2008). Despite the geographic and cultural
differences between Israel and the United States, this lack of attention to agriculture in education
is mirrored in the United States. Schools in both nations place little value on agricultural courses
because it is claimed that these courses do not meet the standards of learning required in the
schools (Tal, 2008). However, school gardens are becoming commonplace at schools across the
United States, motivated partly by the hope that garden curricula can positively affect children’s
food choices: “Taste tests and harvest celebrations give students a chance to try new foods and
learn how their food is grown. Hands-on activities such as garden-enhanced nutrition education
have been shown to increase preference for vegetables” (Izumi et al., 2006, 172). If lessons in
nutrition are reinforced by the availability of fresh foods in the cafeteria, and if students are
involved in gardening, farming, cooking, and other “real-life” experiences with food, they are
more likely to adopt healthy eating as a lifelong practice (Kalb, 2006).

In addition to school gardens, farm-to-school education is gaining popularity in a number
of regions in the United States. Joshi, Azuma & Feenstra define farm-to-school as “a school-
based program that connects schools (K-12) and local farms with the objectives of serving local
and healthy foods in school cafeterias or classrooms, improving student nutrition, providing
health and nutrition education opportunities, and supporting small and medium-sized local and
regional farmers” (2008, 230). Farm-to-school programs take on a variety of forms and levels,
ranging from procurement-related to educational activities. Often the line between the two is blurred, as procurement programs related to student nutrition open up the opportunity for the incorporation of agricultural education into the curriculum (Schafft et al., 2010). A number of studies have found that there is potential for higher test achievement, increased cognitive function and attention, as well as widespread behavioral change among children through the implementation of farm to school programs (Joshi, Azuma & Feenstra, 2008; Graham et al., 2006; Stone, 2009; Dillon et al., 2005). The research on young people’s knowledge and attitudes suggests that there is a strong case for improving teaching and learning about food, farming and land management (Dillon et al., 2005). However, there are limitations, such as the inclination of teachers to participate, keeping students interested in eating healthier, finding a local farmer who is willing to source the food, changing policies to provide incentives for the creation of farm-to-school programs, and getting the community involved (Joshi, Azuma & Feenstra, 2008).

Farm-to-school programs are meant not only to enhance student learning, but also to open up new markets for farmers and improve schools’ connections with surrounding communities. In many schools there is a high level of interest in creating partnerships with local farms (Graham et al., 2006; Izumi Wynne & Hamm, 2010), and likewise, many farms are interested in getting involved with schools (Izumi, Wynne & Hamm, 2010). In many cases farmer involvement is motivated less by income, and more by a sense of moral duty. In the case of an apple grower who had been giving farm tours for nearly 15 years, he offered the tours to increase publicity for his orchard, and, on a deeper level, to help people connect their food with the farms where it is grown, not just the grocery store (Schafft, Hinrichs, & Bloom, 2010). “When students have the opportunity to plant a seed, harvest a peach, or visit a farm, they become more connected to the
agriculture that feeds them, their families, and their communities” (Kalb, 2006, 27). As Tal (2008) wrote, “agricultural education ties children to their country and homeland.”

Although it is becoming increasingly popular, farm-to-school education is not the only way that farms provide farm-based educational opportunities to their communities. Throughout the United States there are farms offering a variety of learning opportunities for a variety of purposes. Some farms offer apprenticeships or internships for individuals who would like to eventually have a farm of their own, or who would like to learn more about farming and what it takes to run a successful farm business. An example of this form of farm-based education can be found at Fat Toad Farm in Central Vermont. Fat Toad Farm is a small-scale dairy specializing in goat cheese and goat’s milk caramel candies. Every year the farm welcomes an intern onto the farm for six months to learn and assist in the daily operations of the farm (Fat Toad Farm, 2011). Through this work and learn internship system the farm is able to bring interested individuals onto the farm to help with the farm work, and to teach them the skills to produce goat’s milk cheese.

Other farms offer interpretive tours to the public, such as Pie Ranch in Santa Cruz, California, and Shelburne Farms in Shelburne, Vermont. Pie Ranch is a small educational farm that grows all of the ingredients that it needs to bake pies on its triangular piece of land (Pie Ranch, 2011). Through a tour of the farm grounds, participation in farm chores, and assisting with pie preparation, individuals who visit the farm are able to learn about sustainable farming and food systems in a hands-on way. Likewise, at Shelburne Farms in Vermont, public tours are offered daily that teach visitors about sustainable farming, livestock, cheese making, maple syrup production, and much more (Shelburne Farms, 2011). Many visitors participate in a guided tour of the farm grounds to learn about the history of the farm and to learn about the functions of the
various components of the farm system. Visitors leave these farms with a greater understanding of sustainable agriculture and the importance of a more localized food system.

There are even farms that will open up their gates to allow college students enrolled in service learning classes to study and learn more about the farm system. For example, the University of Vermont offers a course called Advanced Agroecology that annually partners with a number of local farms. Through these partnerships students learn from the farmers, and in exchange provide a service to the farmer in the form of fieldwork, multifunctionality assessments, and soil samples.

**Curriculum Development**

This section will outline some of the theory and methodology for developing and evaluating a curriculum. Curriculum, as defined by Sowell, is “what is taught to students,” and learning is what students take away from the classroom: knowledge, techniques and values. Although curriculum is often thought of on the classroom level, it is also developed for a number of other levels including societal, institutional, instructional, and experiential (Sowell, 1996). Most relevant to this project is experiential curriculum, which is when the curriculum is perceived and experienced by the students, resulting in internalized learning and personal meaning to the learners.

**Theory**

Constructivist learning design (CLD) is when students create knowledge rather than simply taking it in. When learners are involved in experiential learning, they begin to think both individually and collaboratively to develop personal and shared meaning of the learning. They also start to connect their own knowledge to that which they are learning, and develop a more inquisitive approach to learning (Gagnon & Collay, 2001). Sowell notes, “The most effective
learning experiences are those in which children actively participate in answering their own questions” (1996, 197). In order for students to move from personal meaning to shared meaning in social learning, small groups are a necessary element of the lesson plan. Reflections are the last component of Gagnon and Collay’s CLD and are characterized by collective consideration, data gathering by the educator, connections to big ideas, individual reflection, recording of thoughts, and a revisiting of these thoughts after the learning episode (2001). “Applying constructivist learning principles requires teachers to move away from asking students to recall specific answers to asking questions that encourage student thinking” (Gagnon & Collay, 2001, 74). Questions are an essential piece of constructivist education, and guiding questions are a good way of leading into a lesson to get students thinking.

Development

Curriculum development - the process of designing a curriculum – often begins with the creation of a “views of education” statement, which establishes the purpose of the curriculum and also details the anticipated relationships of the curriculum to the community, as well as between teachers, students, and the curriculum content (Sowell, 1996). “The program philosophy provides a unifying framework that justifies and gives direction to discipline based instruction” (Hanna, 2005, 7). Due to past concern about the lack of foundation for curriculum development in environmental education, Hungerford, Peyton, and Wilke outlined four goals for curriculum development in EE: ecological foundations level, conceptual awareness level, investigation and evaluation level, and environmental action and skills level. All of these must be kept in mind in order to meet the objectives outlined in the Tbilisi Declaration: awareness, knowledge, attitudes, skills, and participation. (Hungerford, Peyton, & Wilke, 1980) When designing a sustainability education program, the 4 C’s – campus ecology, curriculum connections, community
partnerships, and collaboration – are an important consideration. The goal is for students to understand connections, connect to their place, and make a difference in their community (Stone, 2009). The Connecticut Curriculum Development Guide also suggests that higher order thinking – a type of thinking requiring higher levels of cognitive processing – is a necessary consideration in curriculum development because higher order thinking is more valuable because it is more useable in novel situations (2009). Curriculum organization is also an important consideration. For my own project the organization was by “big ideas,” which develops assessments and determines criteria of acceptable performance related to the essential questions (Hanna, 2005). Figure 2 depicts a guideline for curriculum development that was useful in my articulation of the goals of my on-farm curriculum.

### CURRICULUM GUIDE FORMAT

All curriculum design and development work will include:

1. Cover Page with date of acceptance by Board of Education
2. Committee Members
3. Table of Contents
4. Philosophy
5. Beliefs and Protocols *
6. Goals
7. Description of Subject Learning Environment
   - General
   - Grade-level
   - Course level
8. Standards
   - Essential Understandings *
   - Scope and Sequence of Objectives/ Competencies
   - Grade-level Objectives/Competencies, Teaching/ Grouping Strategy and Assessment Methods
9. Assessment
   - End-of-Year Performance Standards and Assessments
   - Grade-level and periodic Assessment Calendar
   - Sample Rubrics
10. Materials and Resources
11. School to Career Connection
12. Information Technology Connection
13. Subject Area Standards
Evaluation and Assessment

Once a curriculum has been developed, the next step is evaluation, which is a way of “improving programs through delineating, obtaining, and providing descriptive and judgmental information about the worth and merit of a curriculum” and the process in which value-laden judgments or decisions are made (Sowell, 1996; Marcinkowski, 1993). Unruh & Unruh define curriculum evaluation as “a process for searching out ways to improve the substance of the curriculum, the implementation procedures, the instructional methods, and the effects on student learning and behavior” (1984, 263). Evaluation is done in a variety of ways, typically through a needs assessment that determines the strengths and weaknesses of a curriculum (Sowell, 1996). In order to collect data on a curriculum, some commonly used techniques for diagnostic needs assessment are: observations, checklists, unstructured observations, and interviews. Intended learning outcomes, or what learners are expected to be able to do with the curriculum, are also taken into account by evaluators (Sowell, 1996), and all activities must have an educational context (Marcinkowski, 1993). To evaluate a curriculum it is necessary to: identify needs, goals and objectives; understand instructional planning, and instruction methods; and to consider the learning outcomes of the curriculum (Marcinkowski, 1993).

Formative evaluation is “the collection of appropriate evidence during the construction and trial of a new curriculum so that revisions of the curriculum can be based on this evidence” and can be used at all stages of curriculum development (Unruh & Unruh, 1984, 273).

VanDerHeyden and Burns (2005) discuss the differences between curriculum-based assessment (CBA) and curriculum-based measurement (CBM). CBA is for use within a mastery model of learning where certain skills have to be mastered before progressing to the next skill in the hierarchy. It is also used primarily to design and deliver instruction allowing for the
identification of specific deficits in need of remediation. CBM is for assisting educational decision-making by measuring the desired functional outcome of instruction. The CBM assessment method is well suited for tracking growth over time and generalizing. Ideally a combination of CBA and CBM is used. Common grade-level, course criterion-referenced assessments and performance-based assessments should be created along with the curriculum and become part of the curriculum guide itself (Hanna, 2005). “The assessments should include clear performance expectations and a rubric that clearly defines the expectations for students and teachers alike. They help to clarify exactly what the grade or course objectives mean and provide a common standard for evaluating how successfully they are achieved” (Hanna, 2005).

Resources

To design the curriculum for my family’s farm, I drew from a number of curriculum guides that offered activities for informal settings. Kepler’s A Year of Hands on Science (1996) was utilized for its extensive list of activities that incorporating science into a lesson plan, while Lingelbach’s Hands-on Nature (1986) was put to use designing activities related to ecology and conservation on the farm. In terms of physical design of the infrastructure needed for certain curriculum activities, I drew from Steps to a Bountiful Kids’ Garden (Gifford, 2001), which had a number of garden designs that work well with a curriculum. The most valuable resource that I found for creating an on-farm education program was the Vermont FEED guide, Vermont Farm to School: A guide for connecting farms to schools and communities (2007), which offers advice for farmers, additional resources to look into different topics, and many activities designed by farmers who have been offering educational programs on their farms for decades.

Conclusion

The nourishment that we require is not only based on food, it is also based on relationships
and understanding connections. It is also a result of “knowing the people who grew the food, knowing that their families were paid a living wage, knowing that the land has been well cared for and protected from development, knowing that the food has not been assaulted with an array of chemistry, that its genetic makeup hasn’t been messed with” (Ableman, 2005). My review of the literature has presented a number of the issues facing agriculture and education today, as well as a number of alternative approaches that I will incorporate into my own on-farm curriculum design and evaluation. Wendell Berry suggests that a good solution to a problem accepts the given limits, improves numerous components of a pattern, accepts the limitations of a discipline, and solves more than one problem (2005). What I am proposing is to find a good solution to the problems of declining small farms and standardized educational approaches, either through increased hands-on learning, involvement with the local community, connecting with the food system, or all of the above. Ableman writes: “Our children need to be fed knowledge and food in more than fragmented parts and pieces. They need to understand whole processes and the interconnection of all things” (2005, 179). As the literature has shown, traditional education is not meeting many of the requirements of education as outlined by Ableman, Orr, Sobel, and Stone. However, there are a number of alternatives and emerging initiatives that may lead to broad institutional change in the food and education systems.
Methods

Research Objectives

Within the overarching goal of farm diversification, the ultimate goal of this study was to qualitatively evaluate how the incorporation of an educational program into the farm’s business affects its social and economic capital. Based on these goals, my objectives for this project were: to investigate methods to increase the farm’s functional diversity; to develop and implement a hands-on curriculum to educate our community about farming and food; to organize a number of events that bring visitors to the farm and increase the farm’s social capital; and finally, to write a successful farm business plan that incorporates an educational program.

To achieve these goals and objectives, I returned home for the summer to refresh my working relationship with my family and to get an understanding of what would be required to prepare the farm for a new direction. Due to the focused nature of this project, I chose to categorize it as a case study, which is “a research strategy that aims to understand social phenomena within a single or small number of naturally occurring settings” (Denscombe, 2007). In addition, I worked to maintain what Dlott et al. (1994) call a “farmer-centric” research perspective, which requires that the farmer is involved in every step of the research process. Although I grew up on the farm, I did not want to make any assumptions about what my family needed or what they were interested in. Keeping my family, most importantly my father, directly involved in my work was essential. To develop the education program I adapted a curriculum that I had designed for the farm in a course at the University of Vermont. In order to evaluate the curriculum effectively, I employed participant observation as well as informal interviews and surveys.
**Site Description**

Stephens Farm is a small Certified Organic farm located in Wantage Township, New Jersey. Established in 1972, Stephens Farm is family-owned and operated, and is managed by my father, Theodore (Ted) Stephens. The 10-acre farm is home to three generations of the Stephens Family, along with a herd of twenty-nine cows, five pigs, one chicken, and approximately eleven barn cats. Prior to purchasing cows in 2008, Stephens Farm was focused primarily on Certified Organic vegetable production. Despite the fact that the soil is “very stony” and “rocky,” as termed by the Web Soil Survey, it is well drained and loamy, making it ideal for growing produce. The farm is located in a fairly hilly area and the elevation on the farm ranges from 400 to 600 feet above sea level. In addition, the farm is located in a Hardiness Zone 5b/6a, experiencing winters with an average low temperature between -5º F and -15º F.

*Aerial photo deleted in online version, but available in print copy at the Environmental Program Office.*

**Figure 3.** Aerial View of Stephens Farm

The property (see Figure 3) has two houses, a main barn, a car barn, and a granary. The farm also has six main fields, two of which are used primarily for vegetable production, with the remainder used for hay and pasture for the cattle. This project was centered around the barn areas and one of the main produce fields closest to the barn. The project also utilized a sensory garden built near one of the houses.

**Diversification Investigation**

The ultimate goal of this project was to increase the diversity of my family’s farm through the incorporation of an educational program into our business plan. However, another part of that goal was to identify other areas of the farm that could be diversified and hopefully improve the
resilience of the farm. Therefore, before beginning work on the education program component of
my project, I first conducted an investigation about other options for diversification. Despite the
variety of livestock and crops already being raised on the farm, my family and I decided that it
would be worth our while to devote time to researching opportunities for diversification. A more
diverse farm has the potential to increase the farm’s income, attract visitors, and ultimately build
a livelihood that is more resilient to change. The areas that were addressed in this research were
social networking, livestock, perennial plantings, and garden design. These are described in
detail below.

**Social Networking**

Something that Stephens Farm was lacking when I arrived home was the opportunity for
social networking. Although the farm had a listing on LocalHarvest, a website used to advertise
farms offering CSA (community supported agriculture) shares, it did not have a website or a
reliable way for people to learn more about the farm. Recognizing that we were not in the 90s
anymore, my family and I decided that it would be in the best future interests of the farm to
create a website as well as a Facebook page. This led to research about inexpensive website
options that are easy to use and update. The intent of these pages was to increase Stephens
Farm’s publicity and serve as a forum to share our farm experiences with the general public.
These intentions directed my research toward blog-style web pages, as well as host sites that
would make posting photos a simple task, rather than an all-day affair. Another one of the search
criteria was that the website be simple enough to use that my parents would be able to use it
without my direct involvement.

**Livestock**

While working on the establishment of a website, it was also decided that it would be
valuable to do some research about livestock. Following this decision, my youngest brother and I spent our rainy days looking up information about livestock, mainly certified organic chickens and boar pigs. Excuse the generalization, but people always want to buy eggs, and what goes better with eggs than bacon? In terms of poultry, we looked high and low for Certified Organic birds that would be ready to lay eggs shortly after we purchased them. The Internet, Craigslist, and the Classifieds section of “Lancaster Farming” left us empty-handed. A Certified Organic boar to breed our four gilts to was also a difficult order to fill, as many of our web searches brought us to Ohio or Missouri – quite out of range for a New Jersey farm. Another key piece that we had to keep in mind while researching was our budget. As great as some of the chickens and pigs were, having an overdrawn bank account was not a desired outcome. My father and I also researched livestock of the insect variety: honeybees. Our intent was to determine what sort of work would be required to maintain hives, as well as what plants would be best suited to a pollinator habitat. We also wanted to learn more about the possibility of having our hives become Certified Organic. Much of the research was conducted via the Internet, as well as publications such as the “NODPA News,” “Lancaster Farming,” and The Backyard Homestead Guide to Raising Farm Animals (Damerow, 2011).

**Perennial Plants**

Another component of diversification that I looked into was planting perennials. At the start of my project my family purchased a number of raspberry, blackberry and blueberry bushes. My task was to research what would be needed to care for the bushes, as well as what type of light and soil conditions these perennials prefer. We also wanted to know how much space different berry bushes and plants would require so that we could determine the best place to plant them. It was also necessary to find out effective organic management strategies for these bushes,
because they are especially prone to disease and pests when not managed properly.

Perennial herbs were another crop that I investigated because herbs are a highly marketable product. I wanted to find out how difficult it would be to start our own herb transplants, and to determine what level of maintenance the plants would need. If the farm is going to move toward perennial plantings, we need to know how much work will be required to establish and care for these crops. Perennial herbs and berries were also of particular interest to Stephens Farm because they could serve a dual function as a marketable crop, as well as a food source for our honeybees.

**Sensory Garden**

In addition to researching for the farm, I conducted a personal research project to figure out how to best design and build a sensory garden that would be used for lessons in the farm-based curriculum. Utilizing my background in permaculture design, as well as resources from the National Gardening Association (Gifford, 2001), I designed a garden that would be accessible, manageable, and planted in a way that would work well with an education program. The garden was designed as a circle with two intersecting paths (see Figure 4). Each quadrant would be planted with varying heights of plants and different types of herbs, flowers, and produce that would appeal to the five senses.

The siting of the garden was initially a daunting task, until I realized that the hill where our aboveground swimming pool was collapsing would be the ideal place for a garden. The location gets full sun for most of the day, it is very flat, and drainage would not be a problem because of the sand beneath the pool. After taking down the pool and spending a lot of time with a tape measure, I drafted a finalized design for the garden. Using old, untreated boards from the upstairs of the barn, my brother and father helped me to cut out and frame the raised beds. I then lined the
outside edges of the garden with bricks from a pile in the old apple orchard. For soil, I used four broken bales of potting soil mixed with composted pig manure and hay bedding, making a layer of soil deep enough to keep the plant roots from getting too bothered by the sand beneath the garden.

Figure 4. Sketch of Garden Design

In respects to plantings, because it was too late to start many of the herbs and flowers that I wanted to incorporate into the sensory garden, I put out a call to the Master Gardeners of the Cornell Cooperative Extension of Orange County, and found myself with more donated plants than I knew what to do with. Once the garden was planted, I spent a good portion of my mornings weeding, deadheading flowers, watering, and studying the plants.

**Education Program**

Once the research process for diversification opportunities was well underway and the sensory garden was partially planted, I began to work on developing the education component of this project.
Curriculum Development

Before I could begin planning events and logistics, I first had to develop and finalize the program curriculum. I decided to modify a curriculum that I had designed as an assignment for a course that I took at the University of Vermont, ENVS 295: Sustainability Education. The curriculum development process began with an articulation of the curriculum goals and determination of what the target age group would be. The goal of this curriculum was to teach Pre-Kindergarten through Grade 4 children about food and farming. Through these topics, the children would learn where their food comes from, build a relationship with their local farmer, and develop a deeper connection to their place. In order to develop an effective and relevant curriculum, I utilized resources from organizations such as Vermont FEED and Shelburne Farms, both of which help farmers and schools to establish farm-to-school programs in the state of Vermont. Along with farm-based education activities, nature and place-based education lessons were incorporated into the curriculum because of the farm’s proximity to the Appalachian Trail and the abundance of wooded and natural areas on the farm. Many of the nature and place-based activities were adapted from those in Hands-on Nature by Jenepher Lingelbach (1986).

Events

Once the curriculum draft was complete, the next step was to plan events through which to pilot test the curriculum. A pilot test is conducting preliminary research before the main study, providing the opportunity for informed reflection on the research design that may lead to the adaptation and modification of a number of factors in the research design (Bloor & Wood, 2006). My initial plan was to have one pilot test in June, followed by an official event in July and another event in August. In actuality, I decided that all of the events were to be pilot tests, and
took place on August 6th, August 21st, and October 1st. I made this decision after realizing that one summer would not be enough time to fine tune the program, or to even make true generalizations about its effectiveness. The events were used to determine if the curriculum activities that I had designed would be appropriate and interesting for my target audience of pre-Kindergarten through Fourth graders. My goal was to have at least five children attend each event to have a spread of opinions. However, the first two events had lower numbers than expected.

Before I could pilot test, I first had to get people to attend the events. My advertising strategy was to utilize the farm website and Facebook page, as well as to produce flyers for distribution (see Appendix B). The flyers were put up in my mother’s office and were posted in PDF form onto the Stephens Farm website. Additionally, weekly reminders about the events were posted on the Facebook page to attract attention to those who had “liked” the page. I also posted updates on the website, and created an “Events” tab under which all of the events and their details were listed. I had also intended to advertise in the local newspaper, but chose not to for fear that too many people would come and I would be overwhelmed.

In terms of having people come to the farm, there were a number of factors and logistics that had to be taken into account. For one, the farm required quite a bit of clean up so that it would be safe and presentable for individuals unfamiliar with a farm environment. Among other things, the scrap metal pile had to be brought to the scrap yard, the barn was in need of cleaning, weeds needed to be pulled, and Moose, the bull, needed to be kept in the pasture away from visitors. Risk mitigation was also a component of the logistics for these events, and I drafted a list of instructions about safety. For example, I had to warn visitors about the cats’ claws, the drop in the barn (where manure collects during milking), biting pigs, and any unsafe structures.
on the farm. Budget was also something to be kept in mind, as the farm was not exactly raking in a profit this past summer. To minimize costs for these events, I decided to plan activities that did not require anything other than a pair of hands, and to use resources that the farm already had on hand, such as seeds and peat pots, as well as paint brushes and paper bags. My total budget for purchasing the supplies for all of the events was $50.

To document and evaluate the events, I relied on journaling, photos, and informal interviews. At the end of each day I would journal about what I had done in my composition book, and I would also make a list of the things that I needed to complete by a certain point in time. Journaling was also how I documented the events. After each event I would sit down and write down what I thought the best part of the day was, and what areas could use improvement, along with anecdotes and quotes from my participants. Photos were an important component of the events, as they served as a way of documenting what I had done, and evaluating how interested my participants looked. Also, once a week I took a walk around the farm and took photos to post to the website and Facebook page. I also took photos of the work that I was doing – a difficult task – so that I would remember what exactly I had done. Informal interviews were my primary strategy for evaluating the successful and not-so-successful aspects of each of the events that the farm hosted. By asking questions throughout the event I could tell how well I was maintaining the children’s interest. At the end of the event I asked about their favorite and least favorite part of the day, and used that to shift my plans for future events.

**Evaluation**

To evaluate the curriculum’s effectiveness, I decided to analyze qualitative data obtained through participant observation and informal interviews with the children and their parents. The curriculum evaluation is based on the guidelines suggested by Sowell (1996) and Marcinowski
(1993), which involve: identifying needs, goals and objectives; understanding instructional planning, and instruction methods; and considering the intended learning outcomes of the curriculum. As the “instructor” during these events, I was both observing and participating in the activities. This allowed me to adapt the curriculum to meet my participants’ needs as well as my own.

Informal interviews were another key component for evaluating the curriculum. These conversational interviews ensured that I addressed the thoughts and statements from participants and parents about what they learned, what components should be kept in the curriculum, and what they would like to learn more about. This feedback was helpful, as it brought to light issues that I may not have recognized, and sometimes reinforced my own thoughts and observations. These interviews were recorded in the form of fieldnotes in my journal. At the final event, I also conducted an informal survey to collect data on demographics and specific activities. I wanted to get definitive information about the experiences, age, and interests of my participants to help with the future development of the program. The survey template is shown in Figure 5.

**Stephens Farm Fall Field Day Survey**

1. What type of area do you currently live in?
   a. Rural
   b. Suburban
   c. Urban
2. Have you ever visited a farm before?
   a. Yes
   b. No
3. How old are your children?
4. What was your child(ren)’s favorite activity?
   a. Meeting the Animals
   b. The Food Chain Game
   c. Brown Bag Botany
   d. Exploring the Sensory Garden
   e. Pumpkin Painting
   f. Leaf Rubbings
   g. Other____________
5. Would you recommend farm visits to others?
Business Plan

After realizing that one summer would not be enough time to effectively implement and evaluate an on-farm curriculum, my family and I decided that the final product of this project would be a revised business plan that incorporates an educational program. The purpose of writing this business plan was to develop a plan for the farm to help my family to keep track of what we want to accomplish in the future. It will also be valuable for grant applications and for the eventual repayment of the farm’s enormous debt.

Given that I had never written a business plan before, my first order of business was to research how to write an effective business plan. Using Google, I was linked to a number of agricultural sites that provided outlines and samples of strong business plans. These resources served as my guide in creating an outline for the Stephens Farm business plan. Once I had written an outline, I did an informal evaluation of the numerous functions of my family’s farm and listed some key topics that I found to be essential to the farm’s mission and business. Then, the weekend that I was home for the final farm event, I called for a family meeting to discuss what we wanted to see happen on the farm in the next year or two. We set some clear goals and objectives, and then talked about what our various roles would be on the farm. Using my notes from the family meeting, I spent a weekend writing a thorough business plan for Stephens Farm, with clear deadlines and a reasonable timeline for meeting these deadlines and achieving our goals.
Results

Due to the multiple facets of this project, the results are divided into three main sections. The first section discusses the results of my investigation into diversification opportunities for the farm. The second section focuses on the development, implementation and evaluation of the farm-based curriculum activities. The final section details the development process of a business plan for Stephens Farm.

Diversification

The primary goal of this project was to improve the resilience of Stephens Farm through increased farm diversification. To do this I conducted an investigation of potential ways in which to diversify the farm. This investigation focused on improving the farm’s social capital through social media, improving the diversity of the farm livestock population, diversifying the farm’s produce offerings through perennial plantings, and creating a sensory garden for visitors to explore.

Social Media

The first way in which I contributed to the diversity of the farm was through the establishment and maintenance of a Stephens Farm website (http://stephensfarmnj.com) and a Stephens Farm Facebook page (http://www.facebook.com/stephensfarmnj). Initially my parents were skeptical about setting up a website because they had been unsuccessful in their past web ventures. I argued that having a website would help us to build the farm’s social capital, as anyone interested in our farm would be able to look up the farm on the Internet and learn about Stephens Farm and its mission. My parents finally warmed up to the idea when I showed them how simple – and inexpensive – it would be to use a Wordress site for the farm website. I also
committed myself to being in charge of all updates and site maintenance and made it my goal to post on the sites at least once a week to keep viewers interested and to keep myself on track for my project. Each week I would go out into the field to assess the state of the farm and take photos that I would use to craft the blog posts. Judging by the number of “likes” on Facebook, I think it is safe to say that viewers enjoyed looking through the photo albums that I created, particularly those with the pigs in them. Being away from home has been an obstacle to keeping the pages updated, but I think that they are still valuable in terms of providing visibility for the farm in the realm of the Internet.

Livestock

A major component of Stephens Farm is its livestock. At the start of this project the farm had four sows (female pigs) and a herd of seventeen cows. Over the course of this investigation the farm gained a small flock of chickens, a young boar (male pig), and two beehives, in addition to the birth of twelve calves.

Chickens

After searching high and low for affordable, nearby Certified Organic laying hens, we decided to go in a different direction. Although it would have been ideal to purchase chickens that were hatched and raised in a Certified Organic system, when the closest hens are a four-hour truck ride away, it is not worth the energy. After a series of serendipitous events, Stephens Farm found itself with a flock of thirty-seven 3 week old Austrolorp chicks that were left over from a 4-H project and facing possible extermination. They were made comfortable in the milkhouse (see Figure 6) until they began to outgrow their tub.
Then, certain issues arose that gave new meaning to the term “pecking order” and it was time to put them into the great outdoors. The outdoor system had some inherent flaws, and many nights were spent rounding up loose chickens. Following a skunk attack, it was decided that the chickens would be safer in the barn, in a reinforced pen that, in a normal world, would have kept even the most determined raccoon or skunk out. That was not the case, however. Unfortunately, on the night of September 28th, 2011, our already dwindling flock experienced a series of traumatic incidents at the hands (or more precisely, the jaws) of two raccoons and a skunk, and now we are left only with Mrs. Chicken (see Figure 7).

Figure 6. The Austrolorp chicks
Pigs

Despite the apparent chicken failure, our efforts to locate a young boar pig were successful. Again, it was nearly impossible to find a Certified Organic boar, so we had to make do with a locally raised, non-certified pig. Despite his strange food preferences and awkward social skills, he was well worth the $50 we spent on him. Because he is being raised following organic standards, as are the gilts, all of their resulting piglets will be able to be Certified Organic, even if their parents are not. Our new boar, aptly called Mr. Pig, is not yet of age to breed the four gilts living next door to him in the barn (Figure 8), but he should be mature enough in the spring of 2012. In the meantime, Mr. Pig and Mrs. Chicken enjoy spending their afternoons together sharing Mr. Pig’s food scraps.
Honeybees were another tentatively successful venture for Stephens Farm. After getting two hives Memorial Day weekend we found out that we had been approved for a grant that my father had applied for, a Wildlife Habitat Incentives Program (WHIP) grant offered through the Natural Resources Conservation Service (NRCS). This grant requires that we set aside a number of acres that will be dedicated for permanent pollinator habitat. The purpose of the grant is to guarantee that pollinator species will have a variety of nutritionally balanced food sources available at all times during their active season. As part of the grant award, an associate of NRCS from the Xerces Society drafted a list of recommended pollinator plant species that are native to Northwest New Jersey. This list is attached in Appendix C. We have until May 2012 to fulfill the requirements of the grant, at which time we will be reimbursed for our grant-related expenses.
This timeline allows us to start a number of the plants in a greenhouse setting, and to clearly designate which areas of the farm will be most appropriate to use for a pollinator habitat. This past fall we did not harvest any honey from our hives because they were so late to come to the farm and we want to ensure that they have enough food stores to get them through the winter and early spring months. We do intend to harvest honey during the spring honey flow when honey production is at its highest and the bees are not as dependent on their stores.

**Perennial Plantings**

Along with the honeybees, the farm also purchased a number of blueberry, raspberry, and blackberry bushes to be planted on the farm. At the time of this writing, their future planted location is still undecided. But I have learned how much space they need, as well as how to propagate them. The raspberry and blackberry brambles can be spaced a close as three feet apart, and they will spread readily without any outside influence, so they should be planted in an area where they cannot encroach on other crops or high use areas. Blueberries, on the other hand, require a higher level of maintenance. The bushes need to be planted in acidic soil, and be at least four feet apart to avoid competition between bushes. Blueberry bushes have a shallow root system, so it is necessary to ensure that there is adequate space between rows, and that grass is not allowed to grow around the base of the bushes. In terms of propagation, purchasing more plants is the easiest method. In regards to producing Certified Organic berries, it should not be especially difficult as long as we are diligent about pest management. Conveniently, these berry bushes serve as a food source for both humans and pollinators, and they have been incorporated into our planting scheme for the NRCS pollinator habitat grant.

Perennial herbs and flowers were another area of plantings that I explored this past summer. Over the past twenty years my parents have found that when they offer herbs and
flowers at their market stand customers will buy them, even if they do not know if they will get a chance to use them. Good smelling plants such as basil and sage seem to hold a special place in our customer’s hearts. To appeal to this demographic, I planted a number of mints, balms, cooking herbs, and plants with medicinal uses to be incorporated into the farm CSA shares this past summer. Our customers loved when they got a bunch of tarragon or a sprig of rosemary to go along with their share. Many of these herbs are perennials that will survive the winter months, so next spring Stephens Farm will be able to sell fresh herbs at its farm stand. Additionally, as with the berry bushes, these herbs can serve a dual purpose for our farm as both a marketable product and as a food source for our honeybees.

**Sensory Garden**

Before I had even started to seriously research perennial herbs, I knew that they would be incorporated into the farm business in some form. As part of establishing the on-farm education events, I had decided that a “sensory garden” would be an excellent learning tool. This garden would serve as a place where visitors could use all of their senses: taste, touch, sight, smell, and hearing. In my garden design, I had originally planned to have the garden be split into distinct quadrants, each with its own theme. I had plans for a “recipe garden,” an herb garden, a pollinator garden, and a “rainbow garden.” I did end up with these four garden types, but they are not as distinct as I had initially planned. I had also originally intended for the garden to be put into one of the farm fields, where I knew that the soil was fertile and easily tilled. However, with the collapse of our swimming pool this past summer, after two years of sitting in its green algal glory, my family and I decided that the former resting place of the pool would be perfect for a garden (see Figure 9). As detailed in my methods, once the pool was taken down for scrap metal my family helped me to build the beds using found materials from around the farm.
After getting the garden beds built and filled (see Figure 10), I was then faced with the challenge of plantings. Most of the early plantings in the beds were whatever plants and seeds that I had available, which, at the onset, were not many: some parsley, basil, and a few Swiss chard plants. I also started a variety of old herb and flower seeds in the greenhouse to see how well they would germinate. After a conversation with a family friend who also happens to be a Master Gardener, I was roped into presenting my project idea at the meeting of the Master Gardeners of Cornell Cooperative Extension – Orange County. At the meeting I shared my vision for the garden and my family friend asked them, if they were able, to donate plants from their own gardens to my project. That was the most fruitful presentation that I have ever given, as I received quite a number of plants for my sensory garden. The full list is included in Appendix D.
Once I had received all of these plants and extended my thanks to my kind donors, it was a matter of deciding where to place the plants in the raised beds. After planting the garden, it looked a bit sparse and unhappy. However, after watering the garden almost daily for two months, spending my mornings weeding and tending to the garden, and filling in the “blank” spaces with annual plants such as Dianthus, the plants more than doubled in size and spread (see Figure 11). In retrospect, I should have paid better attention to how closely I had planted my various mint cultivars. After planting the mints I came to learn that when different types of mint are planted too close together, their flavors can become weak. This did not seem to be a serious problem though. A more pressing issue is that the mint is sending runners across and under the raised beds.
In addition to a sensory garden, I also built a “gourd house.” A gourd house is a trellis-like structure built in the style of a long house that has gourds planted around its base (see Figure 12). As the growing season progresses the gourd plants are trained to grow up the sides of the structure and ultimately there are gourds growing and hanging down from the ceiling of the gourd house. Unfortunately, this component was an afterthought and was not installed early enough in the growing season for the gourds to grow all the way over it. However, the framework, constructed from maple saplings, is very sturdy and can be left standing to be used next summer. It may not have been especially useful for the Farm Field Days, but it has turned out to be a popular pit stop for songbirds, who appear to thoroughly enjoy using the structure as an obstacle course and perching location. Songbird playground seems to have become an emergent quality of the underused gourd house.
While investigating ways to diversify the farm through livestock and plantings, I was also investigating activities and strategies to create a well-developed farm-based curriculum to pilot test. Although diversification in terms of our farm products was important to my family, social capital was an area of the farm that we all agreed was lacking. My father often would say “things need to change around here,” and one of the changes that was consistently mentioned was trying to bring more people to the farm to learn about food and farming. Stephens Farm is not into the idea of “agritainment,” but we did agree that experimenting with bringing people to the farm to learn would be a great way to find out if our farm was suited for events open to the community.
Curriculum Development

As I mentioned in my methodology, the majority of the activities and plans that I used to build the Field Day curriculum were drawn from a curriculum that I had previously developed in the fall of 2010. This curriculum had been written for a potential “farm camp,” so it required some trimming and retooling to be useful for single afternoon events. The lists of activities for each event are attached in the Appendix E, along with a sample activity that I found to be very successful: The Food Chain Game. To use time effectively, the Field Day curriculum was designed in the style of a Farm Tour, moving to and from different locations on the farm for different activities. The tour would begin at the house for introductions and would then move to the front field to pick some green beans and pull up some pigweed to use for the next stop. We would then move on to the barn, where the curriculum shifted to learning about farm animals and the barn. After feeding the pigs I would lead the group up the hill to the sensory garden where there were a number of activities to choose from depending on the day. The afternoon would close with a story and a craft activity, and during this time I would conduct informal interviews.

After the first event it was clear that some of the activities suggested as appropriate for Kindergarten through Grade 5 would actually be better suited for a younger demographic, such as Kindergarten through Grade 1. This led to a redesign of the entire curriculum to make sure that I had activities that would be appropriate for all age groups. This change was essential because it made it easier for me to keep the parents interested and get them involved with the activities. The tour sequence remained the same, but I adaptively altered discussion topics and activities based on the ages and experiences of those in attendance.
Advertising

After spending a good portion of May and June focusing on fieldwork, gardening and farm clean up, July was spent planning the coming events and working on the curriculum. In my initial plans I had called the farm events “Fun on the Farm Day” or “Farm Education Days.” After some discussion with my parents, I decided to call the events “Farm Field Days.” This was because the events were held entirely in the field and we did not want the events to have any festival or camp-like connotations because that was not the nature of the events. To ensure that I had attendees for the Farm Field Days, I had to advertise. This in itself was an experiment because I wanted participants, but I also wanted to avoid attracting a large crowd of people. The curriculum needed to be pilot tested in small groups before I could offer it to large groups of visitors. Another challenge that presented itself was the fact that Stephens Farm is located in a rural area where many of the children have grown up on or around farms. How was I supposed to get people to come to the farm without inviting the entire town, and how was I going to draw out my target audience? This is an ongoing question that I will explore in the discussion of this paper.

Through these events I found that including a blurb about the events in the emails sent to the farm’s bulk-food buying club members and CSA shareholders was fairly effective. The majority of the participants were the children of regular customers and therefore most of the attendees had visited the farm before, or at the very least their parents had. In addition to emails, I also posted advertisements on the website and the Facebook page in hopes that some silent viewers would come visit the farm. My mother also brought flyers (see Appendix B) to her place of work and talked up the events with her coworkers. It turns out that soccer is a major limiting factor to attendance of fall farm events, as many children were unable to come to the events due
to their sports obligations. It seemed that attendance was higher when word-of-mouth was involved in the advertising process, but future events will be necessary to determine if this was actually true. Advertising was an essential piece of this project and after seeing the results of our efforts this summer it is definitely an area in need of future improvement.

**Events**

To prepare for the Farm Field Days, I spent a good amount of time planning and gathering supplies for the activities. This entailed determining which activities I actually wanted to use during the events and then finding whatever supplies I could on the farm. Farm clean-up and garden care also took some time because my family and I wanted the farm and its associated areas to meet our presentation standards. My budget for the materials that I had to purchase for the events was $50.00. Figure 13 details the supplies and their costs.

<table>
<thead>
<tr>
<th>Supply</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tempera Paint</td>
<td>$10.50</td>
</tr>
<tr>
<td>White Board</td>
<td>$7.99</td>
</tr>
<tr>
<td>Magnets</td>
<td>$1.99</td>
</tr>
<tr>
<td>Snack, paper plates, cups, napkins</td>
<td>$6.00</td>
</tr>
<tr>
<td>Paint brushes</td>
<td>$3.00</td>
</tr>
<tr>
<td>Mixing Buckets</td>
<td>$2.99</td>
</tr>
<tr>
<td>Construction Paper</td>
<td>$2.50</td>
</tr>
<tr>
<td>Seeds</td>
<td>$14.00</td>
</tr>
<tr>
<td><strong>Total:</strong></td>
<td><strong>$48.97</strong></td>
</tr>
</tbody>
</table>

Figure 13. List of purchased supplies for farm events.

Although I had wanted to hold an event once a month from June through September, with the amount of fieldwork that I did this was not feasible, so I narrowed my plan to three events over the course of August and September. The dates and attendees for the event are shown in Figure 14 below.
### Table of event dates, number of attendees, and the ages of these attendees.

<table>
<thead>
<tr>
<th>Event Date</th>
<th>Number of Attendees</th>
<th>Ages</th>
<th>Visited the farm before?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Saturday August 6, 2011</td>
<td>1</td>
<td>7</td>
<td>No</td>
</tr>
<tr>
<td>Sunday August 20, 2011</td>
<td>2</td>
<td>2, 4</td>
<td>No</td>
</tr>
<tr>
<td>Saturday October 1, 2011</td>
<td>6</td>
<td>5, 6, 8, 9, 11, 11</td>
<td>2 Yes, 4 No</td>
</tr>
</tbody>
</table>

The First Event

The first field day, as well as the first pilot test, was held on Saturday, August 6\textsuperscript{th}, from 11:00 am to 1:00 pm. Despite my attempts to have at least five attendees, it turned out to be a very small event, with just one child attending. This participant, the very shy 7 year-old daughter of one of the Farm’s CSA members, was very knowledgeable about farms because her mother had grown up on a farm. It also became clear that she was a cat lover, and after each activity was over she would ask if we could go back to pet the kittens.

This first event revealed that, as great as a Scavenger Hunt sounded on paper, with only two people it was not practical or fun. Because it was just the two of us, I decided to make the curriculum less structured and what we did depended on what we really wanted to do. After making this decision, we ended up feeding the pigs weeds on three occasions and went on a scavenger hunt for insects and frogs instead of plants (see Figure 15). The true success of the day was getting the participant to a point where she was so excited and comfortable that she began talking non-stop. This helped to boost her confidence and, despite her fear of reading out loud, she read *The Big Red Barn* by Margaret Wise Brown (1989) to me without any problems.
The Second Event

The second field day, held on Sunday, August 21st, also had a very small turnout. This event had to be slightly modified, as the two brothers who attended were only 2 and 4 years old, while the curriculum was intended for 5–11 year-olds. The family also came nearly an hour late, so certain activities, such as green bean picking, had to be shortened. The greatest challenge with this event was holding the attention span of a two year-old and convincing the four year-old that he did not need to be shy around me. Green beans were a great icebreaker for this situation, and if I recall correctly, after declaring his love for green beans, the four-year old ended up eating nearly 25 of them (see Figure 16).
As with the first event, I decided to keep the “Meet the Animals” component, so we picked some weeds to feed the pigs. The boys loved the little boar pig, but the four big girl pigs scared them a little bit so I had to cut the feeding of the pigs short. Instead, we fed the chickens that were penned up on the front lawn. This presented the opportunity to talk about what kinds of foods we like to eat, such as eggs and bacon, compared to what chickens and pigs like to eat. Framing food questions this way seemed to help the boys to understand what different animals eat. Also, after attempting a Bingo game in the garden, I learned to never give a two-year-old a marker… Taste testing was also a component of this afternoon. After sampling mint Elijah exclaimed “Too spicy!” and spit it out all over the ground. The same spit reflex occurred when he tried a green bean for the second time. We ended the day with a reading of *CLICK, CLACK, MOO: Cows That Type* (Cronin, 2006) a book that was both a giggle producer and an appropriate book for their stages in development.
The Third Event

The Fall Field Day took place on Saturday, October 1st. In attendance were six children ranging in age from 5 to 11 years old, as well as four parents. Being away at school for a month meant that I was not as prepared for this event as I would have liked to be, and I faced a number of obstacles. The weather in Wantage, New Jersey, had been somewhat different from that of Burlington, Vermont, as it had been much colder and rainier. By October 1st many of the field crops were done producing, and on the day of the event it was cold and raining. This resulted in my having to cut out three of my planned activities: compost making, looking for earthworms, and harvesting. I also had to cut out the chicken activity, as all but one of the flock had been killed by a gang of raccoons and skunks just two days before the event. With these activities cut out, the afternoon was centered around the barn and the sensory garden, as they were the only useable areas of the farm. These setbacks were ultimately helpful to me, as they helped to direct the Food Chain Game activity, as well as questions about our favorite foods compared to the favorite foods of animals. The food chain game was fun because the children were each given a “piece” of the food chain, such as sun, soil, and a cow, and they then had to organize themselves in the order that the food chain would follow. Watching their thought processes about what order they should be in showed that they were not just daydreaming when we had been having a discussion about the food system.

Due to the range of ages in this group, at some points I made the decision to have the 5 and 6 year-old do modified versions of the activities that I was leading. I did not want to leave anyone out, but in some cases, such as when we were talking about volunteer plants and how corn gets its kernels, it was easier to have the boys picking cherry tomatoes and tasting the difference between the three varieties. The final activity of the day, pumpkin painting (see Figure
17), was a well-received activity, though it lacked a specific educational agenda. We did discuss different foods made with pumpkin, and I explained to the families that the pumpkins they were painting were pie pumpkins, so if they wanted to eat their pumpkins they could just wash the tempera paint off and cook them.

![Figure 17. One of the spooky pumpkins that a participant painted.](image)

**Curriculum Evaluation**

To effectively evaluate the events and the lesson plans that I designed for them, I utilized a number of informal, qualitative evaluation strategies. These included: participant observation, informal interviews, and orally administered surveys.

*Participant Observation*

Observations were my primary method for evaluating the strengths and weaknesses of the curriculum that I was testing. At the end of each event I would sit down and write field notes about what I had observed, focusing on the children’s levels of interest in different activities,
what they had learned about farming, and what activities needed improvement. For example, although it was never verbalized, I observed that my participant in the first event was not at all interested in a garden scavenger hunt. This observation allowed me to shift gears and make changes to the activity to try to make it more appealing. After testing these changes in the second event, I found that the event was still not very successful. This resulted in the removal of the activity from the lesson plan for the third event.

Through my observations, I noticed that, in general, worksheet activities in the garden were not very successful, particularly the scavenger hunt activity discussed above. Also, the larger female pigs were very intimidating for small children, as well as some of the adults. The smell of the barn was something else that I noted as a problem, as many participants commented on the smell. Although I tried to make it a teachable moment about manure as fertilizer, the smell was a major distraction for some of the individuals.

One of the activities that I noted as being successful over the course of all three of the events was a discussion about plant parts in an activity called “Brown Bag Botany” (see Figure 18). This was followed by a taste test in the sensory garden. Although Elijah thought mint was too spicy and Mae was scared to eat a nasturtium, the children were engaged with the garden. Another sense that I invited the children to explore was scent, and after some gentle encouragement they were rubbing and sniffing lemon balm leaves, proclaiming “it smells like lemonade!”
Figure 18. In the garden following the Brown Bag Botany activity, I explain to the boys that nasturtiums are an edible flower, and encourage them to taste the flowers.

**Informal Interviews**

In addition to observations, I also conducted informal interviews in the form of conversations with the children and parents who attended. By talking to the participants I was able to learn more about them and what they already knew about farming. For example, two of the attendees were from a suburban community, but their nursery school had goats and chickens that they were able to interact with on a daily basis. Other children had gardens at home that they helped their parents with. And others had never been to a farm before and voiced unhappiness about being outside for an extended period of time. Through the interviews I came to find that all of my attendees, even within families, had a wide range of experiences relative to food and farming.

For the majority, a farm visit was not something new for them, but having guided activities in an outdoor setting was. I came to find that reading books outside was something that
the children really enjoyed, and they were very comfortable sitting on the grass listening and sharing in the reading of the stories. Based on the interviews I also noticed that playing with the cats was something that was consistently brought up as a fun thing. It made me wish that my barn cats were not so friendly, and I couldn’t help but wonder what would have been the first thing on their list if the cats had not been a factor. I am still thinking about ways to incorporate my feline friends into a lesson.

Survey

For the final event I also incorporated an informal survey into my evaluation methods to gain some guided participant feedback to specific questions. The survey was administered orally and asked questions such as “has your family ever visited a farm before?” and “what was your family’s favorite activity?” The survey template is included in the methods section of this paper. The questions were directed to the parents because I wanted to separate data by family rather than by individual. I chose this separation because, even though the event was focused on children, I wanted the entire family involved in the evaluation process. I also assumed that the parents would be the ones to tell their friends about the farm visit, and I wanted to get a sense of what aspects of the day their family would pass on to other people. The results of this survey are shown in Figure 19.

<table>
<thead>
<tr>
<th>Question 1: Area</th>
<th>Family 1</th>
<th>Family 2</th>
<th>Family 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rural</td>
<td>Rural</td>
<td>Rural</td>
<td>Suburban</td>
</tr>
<tr>
<td>Question 2: Experience</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Question 3: Ages</td>
<td>5 years old</td>
<td>6, 9, and 11 years old</td>
<td>8 and 11 years old</td>
</tr>
<tr>
<td>Question 4: Favorite Activity</td>
<td>The cats</td>
<td>Pumpkin Painting, Food Chain game</td>
<td>Exploring the Garden</td>
</tr>
<tr>
<td>Question 5: Recommend to others</td>
<td>Maybe</td>
<td>Maybe</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Figure 19. The results of the survey that each family took at the end of the Fall Field Day
Business Plan

The final product of this project was a farm business plan. This business plan will serve as a guide for the future goals of Stephens Farm and will likely be a useful tool when applying for grants. A business plan is an invaluable tool for any business, because once it is written it can easily be adapted to different situations such as grant applications or financial planning. In order to draft an accurate business plan with attainable goals, I spent much of my summer taking notes about the ideas that my family had for future directions. After examining these notes and holding a family discussion about what we all wanted to see the farm become in the next one to two years, I feel confident that the business plan that I wrote will be a useful tool for Stephens Farm (See Appendix A).

As a family, we decided that the farm needed to be diversified in a way so that the components of the farm system would serve multiple functions. For example, by planting more perennial crops and herbs, we would be reducing the time spent using a tractor, we would have a highly desired product to sell, and the plantings would function as a food source for our honeybees. The honeybees will serve the dual purpose of honey production and pollination of the annual farm crops. The annual crops, such as vegetables and hay, will help to support the farm economically and go toward feeding our livestock and ultimately our family. Because of the dynamic nature of the farm, this business plan will be a working document subject to changes as seen fit. For now the current business plan has the Stephens Farm seal of approval and will be a useful tool for planning during the coming winter.


**Discussion**

This section details the findings of this case study, and makes connections between what I found in my research in comparison to the literature. The discussion is divided into four main sections. The first section discusses the successes and shortcomings of working to increase the multifunctionality and diversity of my family’s farm. The second section focuses on the education component of this project in relation to how it was lacking and how it met its goals. The third section discusses some of the obstacles that I faced entering into the project. The fourth section is a reflection on the project and a discussion of future directions for the farm.

**Increasing Diversity**

The ultimate goal of this project was to increase the functional diversity of my family’s farm to improve the resilience of our livelihood. To revisit what I wrote earlier in this paper, I define a livelihood as a way of life that provides a person with the resources they need to acquire basic necessities, and which contributes to the individual’s self-identity and wellbeing through the generation of various forms of capital (Scoones, 2009; Amekawa, 2010). Farming is our livelihood, it is what gets my family out of bed in the morning and keeps us going, even during the tough times. It is what we love to do. But no matter how much love we have for farming, if the farm cannot pay its bills and sustain itself, it is at risk of becoming yet another statistic illustrating the decline of small, family-owned farms in America.

To maintain our livelihood we will have to improve the resilience of the farm system. We need to feel confident that the farm can pay off its FSA loan, and that my family can afford to buy food every month. To be resilient, a farmer’s livelihood must be able to easily adapt to and recover from changes in the system, such as weather events, loss of markets, or crop failure (Scoones, 2009). One of the main strategies to achieving resilience in a farm system, or any
system for that matter, is to increase the diversity and multifunctionality of the farm. Some researchers have noted that, with proper management, a small-scale, diversified farm can be more productive and economically viable than standard large-scale conventional farms (Altieri, 2009). As a family we agreed that to protect the future of Stephens Farm we needed to make changes to how we did things, and diversifying the farm seemed like the logical first step.

Based on my family’s agreement, part of the experimental design of this project was to determine if increasing the diversity of Stephens Farm would improve its resilience, particularly in terms of economic viability. Using a two-pronged approach to diversify the farm, I researched ways to diversify our sales, and attempted to bring people to the farm to increase our social capital and build our customer base. The first prong of the approach was relatively successful, as the farm can now choose from a number of different options to support it in the long-term, such as sales of meat, milk, honey, berries, and herbs. With all of these additional components the farm also has potential to incorporate value-added production into its future ventures. However, despite the successful diversification of the farm, the second prong was not especially effective. I am of the opinion that Stephens Farm cannot be economically successful until we find an effective way to build the farm’s social capital. Despite my attempts to increase the farm’s social capital through web-based media and on-farm events, the farm only sold five CSA shares and all of the events that I held had very low attendance. These poor results suggest that a diverse farm system is not enough to improve resilience if the farm struggles to effectively market itself to the public.

**Farm-based Education**

A key component of my strategy to improve the farm’s social capital was the development of a farm-based education program that would bring visitors to the farm to learn
about food, farming, and nature. As the United States moves forward in its trajectory of globalization and standardization, food literacy is declining (Nordahl, 2009) and “fast food values” are taking over the American culture (Waters, 2005). People are no longer connected to the land, and many do not hold knowledge about food and farming beyond the plastic bags at the grocery store and the photos on their boxes of cereal. When a person has no connection to the food that he or she consumes, does not know how it was grown or where it comes from before the grocery store, that person is missing an essential piece of knowledge about the food system (Ableman, 2005). To illustrate this point, at my final event there were a number of attendees who had never seen a tomato growing on its mother plant before, and who did not know that garlic and onions were roots that grew underground. Regardless of the fact that they knew the parts of a plant and what a plant needs to grow from their textbooks, these children could not identify examples of these plant parts in reality. If a child grows up not knowing how food is grown, how will that child be able to make informed choices about the foods that he or she eat as an adult?

In designing this curriculum and planning these events, I hoped to address the disconnect that exists between the farms that produce our food and the person who eats this food. These events were intended to increase food literacy (Lyson, 2000) and help families learn to develop a deeper sense of place by utilizing experiential learning. Many educators have suggested that when children are directly involved in the learning process, particularly through hands-on activities and real-world examples, they are more likely to retain the information that they are being taught. They also start to connect their own knowledge to that which they are learning, and develop a more inquisitive approach to learning (Gagnon & Collay, 2001; Barlow, 2009). Taking this to heart, I designed a curriculum that required walking, building connections with the outside world, critical thinking, and focused on employing all five of the senses (see Appendix E). I
hoped that styling lessons in this manner would bridge the gap that I have noticed between the classroom and the outside world. It was also important to me that the participants learned about a system before they learned about its individual pieces so that they would better understand where they fit into the food system and the ecosystem. To do this I drew from the principles of nature-based education and sustainability education. It can be detrimental to examine just the individual parts of a system because then one does not truly understand the functioning of the whole (Meadows, 2008).

Something that I found to be especially effective in this curriculum was explaining the food chain. When your chicken nuggets come pre-processed in a plastic package from the grocery store, it can be easy to forget that the nuggets were once part of a living creature that had its own dietary needs. To explain the food chain I employed a strategy from Gagnon and Collay’s constructivist learning design (CLD), which involves asking guided questions that encourage the children to think deeply about their answers (Gagnon & Collay, 2001). I would start by having the children tell me what their favorite food was. A popular example was cheese pizza. We would then take this food and break it down into its main ingredients: flour, cheese, sauce, basil. Then we would talk about where each of these ingredients came from, how they were grown or raised, and what the sources of these ingredients required to live. For example: cheese comes from a cow; a cow eats grass; grass grows in the soil; grass needs sunlight, water and nutrients; and so on. By breaking the food chain down into comprehensive parts, the children were more aware of all the factors that went into a slice of pizza. Rather than focusing on just one part of a plant, I tried to help the participants understand the entire system that a plant is a part of.
In general, I found the curriculum to be fairly successful. Although there are a few activities that I will not use in the future, such as the scavenger hunt activity, I am confident that the curriculum met its goals. Children who had no experience with farming came to our farm and by the end of the event they could tell me the food chain from rocks to cheese, they had tried new foods, and they could tell me what part of a plant different vegetables were. It was difficult to determine if the curriculum affected the children’s sense of place, but I think that because the event was only a single afternoon, this goal was probably not met. However, it has been said that “when students have the opportunity to plant a seed, harvest a peach, or visit a farm, they become more connected to the agriculture that feeds them, their families, and their communities” (Kalb, 2006, 27). This experience could be a valuable first step for the children to begin cultivating a deeper sense of connection to their place.

An interesting problem that I came across in terms of the curriculum was that the sensory garden that I had invested so much time into caring for was not easily incorporated into the curriculum. Despite what I felt to be a great design, it was very difficult to integrate it and to get the children excited about being in it. Looking back, I wonder if this problem was rooted in the fact that the event began with meeting the farm animals before heading up to the sensory garden. As much as it pains me to say it, plants are not nearly as exciting as a pig or a cow. In the future I intend to rearrange the format of the day so that the garden is the first place that we start our activities. Maybe then the participants will be more present and excited because the animals have not yet stolen their affections. It is also possible that I just did not have adequate curriculum materials that would help me to better incorporate the garden into the curriculum (Graham et al., 2006).
The main issue that I experienced with trying to improve our social capital through events was that we had very limited turnout. I am sure that this is due in large part to the fact that Stephens Farm is located in a rural area that is somewhat fragmented. Many of the new residents living in the developments did not grow up in Sussex County and do not have the small town connections that used to make the area unique, and make spreading the word about an event fairly easy. In the future I think that advertising in the newspaper will be more effective than relying on flyers and word of mouth. I think that there was also a level of anxiety about bringing people to the farm. It was difficult to put the farm in a position where it may receive negative feedback based on the condition of the property. There was a huge concern that visitors would respond negatively to the events because our farm is not especially clean, orderly or beautiful. Ultimately this was not an issue, although I did field a number of questions about why there is manure in the barn and why our barn is only halfway painted on its front. Keeping up appearances is definitely a good thing to do, but I think that most of the visitors came to experience the farm, not offer a critique of its aesthetics, which can be seen in Appendix E.

**Obstacles**

In addition to difficulties with bringing people to the farm, I was also faced with a number of obstacles that influenced the outcomes of this project. Although not directly related to the project, issues such as budget and balancing my time while coping with the health of my family had a definite impact on the planning and direction of this project.

**Budget**

One of the motivating factors for this project was to improve my family’s ability to make a living at farming rather than taking a loss every year. I also wanted to find a way to guarantee that my parents will be able to make payments on our $150,000 loan debt. Therefore, from the
onset, I knew that one of the main challenges that I would have to work with was my budget, as the farm was not going to be a funding source for my project. I had initially hoped to mitigate this problem by applying for grant funding. However, by the time that my project proposal was approved it was too late for me to apply for any grants to fund my project, and I was not sure that I would be able to personally afford all of the supplies that I needed for a successful project.

Through careful planning, scrounging, and list making I was able to find many of the materials that I required for the successful completion of my project. My most important finds were some old untreated boards from the upstairs of the barn, leftover bricks found in the orchard, broken bales of potting soil, old seeds from my father’s seed box, and saplings for building trellises. In total, I spent only $50, which went toward supplies that I needed to buy new, such as a whiteboard, paint and paper plates. This proved to my family and I that we could begin making improvements to the farm, a little bit at a time. We often feel that everything needs to be done at once, but with a “baby step” mindset, it is possible that by this time next year the farm will be ready to support its new ventures, such as cheese-making and educational workshops.

Family Health

Another factor that motivated me to do this project and increase the diversity of my family’s farm was the health of my family. In January 2011 my father was diagnosed with Multiple Sclerosis (MS). By the time he was diagnosed, he was already in the progressive stage of the disease. Fortunately, multiple sclerosis is not a terminal disease. Every case is different, but most commonly it leads to decreased mobility along with a variety of other symptoms that can be very frustrating for the patient. The difficult realization following the diagnosis was that, up to this point, my family’s livelihood had been dependent on my father’s ability to be mobile. The
diagnosis made clear that finally, after many years of it being said, “things need to change around here.”

Coping with this diagnosis has been extremely taxing on my father, and has deeply affected my immediate family. It hurts to see someone that you love struggling. As the oldest child I felt that it was my responsibility to come home for the summer, not only to work on my project, but, most importantly, to help my father in any way that I could. At the start, my project was designed as an opportunity to field test the curriculum that I had written. But after being home for a few weeks, the nature of my project changed to include an exploration of ways to diversify that allowed my father to continue farming with limited mobility.

As a result of this decision, the thing that I struggled the most with this summer was balancing my time between helping my father with fieldwork and working on my thesis project. In the grand scheme of things, as great as an on-farm education program sounded, the more immediate needs of my family took precedent. Rather than leaving my father to do everything by himself, I chose to spend less time on my project and more time helping with planting, weeding and harvesting. I did not forget about the education component of my project. But until July I did not do much work on it other than building and filling in the sensory garden. I am fully aware that, had I spent more time planning the events and working on the curriculum, the education component of this project would have been far more successful. However, because this project was centered on enhancing my family’s livelihood and ensuring their wellbeing, I think that the wellbeing of the existing farm business and my family was more important than the wellbeing of my curriculum.

Although the education program would have benefitted from more planning time, this project had a number of emergent qualities that I found more important than the events. For one,
I was able to help my father on the farm with things that I had never done before, such as shoveling manure and transplanting tomatoes. In addition, rather than putting all of my eggs in one basket, I was able to broaden the scope of my project to research other means of diversification that might be more effective than on-farm events. And most importantly, I was given the opportunity to gain a more realistic understanding of what it is that my family wants to see in the future.

**Future Directions**

In retrospect, a single summer was hardly enough time to evaluate the impacts of increased farm diversity and improved social capital. This evaluation was particularly difficult to accomplish this past summer due to the wet, cold start that we had to the growing season, followed by scorching hot, near-drought conditions in the middle of the summer. A true analysis may have been possible if all of the added factors of diversity had been incorporated into the farm system simultaneously, but this was not realistic. Given more time, I aim to evaluate the long-term effects, if any, that social media and on-farm events may have on the farm’s accumulation of social capital. For example, in the spring of 2012 Stephens Farm will have organically-raised beef for sale. This is a highly desirable product that, if effectively advertised, perhaps through the newspaper and word of mouth, has the potential to attract more customers to our farm. It is likely that, as our customer base builds, the website will become a useful reference tool for customers to learn more about the farm and to view the availability and pricing of current and future products such as beef, cheese, honey, produce, and pork.

To minimize the challenges that Stephens Farm faces in terms of attracting customers and selling products, I think that it will be necessary for the farm to adopt some of the basic ideologies of civic agriculture and agroecology. From civic agriculture, I think that Stephens
Farm should place emphasis on building community through interactions between community members and their local farmers. These interactions not only strengthen the farm’s economic viability, they also hold the potential to “revitalize rural landscapes, improve environmental quality, and promote long-term sustainability” (Lyson, 2000, 44). From agroecology, on the other hand, I recommend that Stephens Farm place greater emphasis on multifunctionality within the farm system. Multifunctionality integrates the production of agricultural goods with the protection and enhancement of ecosystem services in order to meet multiple human needs and create a sustainable system (Jordan & Warner, 2010). A diversified farm may provide a number of ecosystem services with multiple functions, but without an effective way to share these services with the human component of the ecosystem, the farm will struggle.

Stephens Farm needs to explore ways to build community in a fragmented rural landscape so that it can increase the multifunctionality of the farm system and enhance its livelihood. To do this, I think we will need to experiment. We did not have a farm stand set up this past year, so we should have one set up for next summer to find out if that draws more people to the farm than a CSA model did. Another strategy to test is advertising in the local newspapers, rather than relying on serendipitous web-browsing events that bring people to our farm website. Rather than just being a Certified Organic farm that sells produce and meat, Stephens Farm could become a place for the public to learn about farming and Certified Organic production.

The most important part of this project was for me to leave behind something tangible that my family could use to guide the future directions of the farm. At present I am still not certain that I will end up back in New Jersey after I graduate this December. To ensure that my project has some longevity for my family, even without my presence, I provided them with a
number of final products that should help the farm to take these suggestions to heart and reach its future goals.

From the formative stages of this project I knew that I would be producing a curriculum that would be used for on-farm events involving children. Although it is not without flaws, this curriculum has some activities that were very useful for teaching children about the food chain and their food. It is my intention to continue modifying this curriculum until I have a product that is “right” for Stephens Farm. That means planning the events further in advance, creating better surveys to measure how the activities are received, and finding a way to use the sensory garden more effectively. Although we still plan to host some family-oriented events, Stephens Farm intends to move toward intensive “workshop days” for a more mature audience. These workshops will cover topics such as honey harvesting, the meaning of Certified Organic, and cheese making.

Ultimately, one of the most important components of this project was a new business plan for Stephens Farm to use for its own guidance and for grants. This business plan is attached in Appendix A. With this business plan, Stephens Farm can plan ahead without feeling completely overwhelmed. For the past few years my father has been saying that “things need to change around here,” but we never write down the changes that we want to see happen. By recording our thoughts and articulating our goals, the business plan has provided us with a concrete plan to reference when it seems as though the business is going through a tough time. Rather than focusing on an in-depth market analysis and financial plan, the resultant business plan is centered around goal setting and future farm products, particularly those of a value-added nature. The business plan will be a useful tool for the farm as we move forward with grant applications, workshops, and value-added production.
Conclusion

Leaving my family’s farm at the end of the summer was one of the most difficult things that I have had to do in a long time. Everything is up in the air right now with my family. Despite all of my efforts this summer, the farm was still not in an ideal state when I had to leave. I wanted to stay, to keep helping my father once my youngest siblings went back to school, to make sure that our plans are seen through. But I could not, and I was left with the pressing questions: how will I continue to help the farm in the future? An education program is great, but without my presence, will family-oriented events continue? The farm is much more diverse now, but how do I keep tabs on the components that I played a key role incorporating into the farm system?

In answer to some of these questions, I feel that this project has provided sufficient groundwork for my family to continue without me. Not only did we draft a business plan to use as a future guide, we have started working toward the goals and objectives of this plan. By this time next year, there is no doubt in my mind that Stephens Farm will be in an improved economic situation. The farm will have beef and pork for sale, our cows will be producing milk, the honey will be flowing, and there will be perennial berries and herbs in the ground. Stephens Farm will also be applying for grants, and it is likely that the farm will be involved in the production of value-added products such as cheese. With all of these products available for sale, even if the education program is not maintained, my family will still be able to draw customers to the farm and strengthen their livelihood. Ideally Stephens Farm will continue using education programs as a means of drawing people to the farm. I do not expect that the Farm Field Days will last without my presence, but with a little encouragement I think that my father would be able to hold intensive workshops to teach people about different aspects of the farm business. Based on
what I saw this summer, any positive way in which the farm can increase its visibility within the community will be helpful to the business. Although I had grand plans to improve the situation on my family’s farm in a single summer, I have come to understand that effective change for Stephens Farm will require time to evolve.

Also, because a farm is a dynamic system, always changing, always in need of adjustments, I recognize that my project will never be truly “done.” No matter where I end up in the future, either near or far, I will continue working with my family to adapt and improve our farm. It is important to keep the communication lines open, to talk to other farmers so that we can learn from each other, and to learn from our customers what it is that they expect from us. Not only do I want to ensure the future of my own family’s farm, I want to see to it that family farms across the nation are able to survive through these tough times. In my opinion, it is during times like these, when the going is tough, that people are willing to make changes to a system that is no longer effective. If other family farms across the United States begin adjusting their own markets and strategies, it is possible that we will come out of this as a thriving breed, not a dying one.
References


connecting farms to schools and communities.


Appendices

Appendix A: Stephens Farm Business Plan

Stephens Farm
Certified Organic by N.O.F.A.- N.J.
Business Plan 2011

Ted and Annemarie Stephens and Family
467 Route 284
Sussex, New Jersey 07461-3921
973-875-2849
stephensfarmnj@aol.com
http://stephensfarmnj.com
Introduction

Stephens Farm is a small-scale, diversified Certified Organic farm committed to providing fresh, affordable, chemical and hormone-free food to our customers. The farm has been Certified Organic since 1992, and raises a wide variety of produce. Through USDA Organic Certification and sustainable land use practices, we strive to protect the environment for future generations and lessen our impact on Earth. We also work to educate the general public about where their food comes from and what Certified Organic means.

Goals

The goal of our farm is to produce quality products at a price that will provide a comfortable income for our family and allow for us to explore new directions for our business, such as value-added products. To pay off our loan debt in a timely manner, we intend to focus our energies on improving our dairy operation, as well as incorporating more value-added products into our business. Through increased diversification, we intend to increase the farm income and improve our production efficiency.

Objectives

To achieve these goals, our objectives are as follows:

- Put up permanent fence to make rotational grazing a less intensive process
- Set up our milk house to begin producing cheese by Spring 2012
- Find a market for our extra milk once the cheese making operation is established
- Rent more ground to take hay off of and use for pasture
- Finish and slaughter nine steers to sell as beef
- Breed pigs to produce feeder pigs as well as pigs for slaughter
- Establish two more bee hives on the property to improve pollination and produce more honey
- Add more perennial crops, such as berries and herbs, into our farm system to appeal to a wider range of customers
- Focus on growing fall produce, such as squash, corn, greens, potatoes, and garlic so that the spring and summer months can be focused on hay
- Host farm “field days” or “open house” days with workshop sessions to bring the community onto the farm and increase our social capital

Implementation Strategy

In order to follow through on our objectives, we at Stephens Farm have created an implementation strategy that will allow for the farm to focus its energies in a more productive manner.

Fence

Before anything else, the top priority for the coming year is to install permanent fence. This will streamline the rotational grazing process, and, most importantly prevent the cows from breaking out of the fence on a weekly basis. Stephens Farm has been looking into grant opportunities that would provide fund matching for our investment. Because we have to install the fence no matter
what the situation, it would be very helpful to have grant funds to help us put up quality permanent fence.

**Dairy**

As we move forward, livestock will become the principal means for the farm to generate income. The first step in this shift will be to focus greater energy on the Stephens Farm dairy operation. Presently, the herd is comprised of twenty-nine cows. One is our Jersey bull, Moose, who has been a very successful breeder for us. Nine are steers that will eventually be sent to slaughter. The remaining nineteen are cows and heifers that will be the base of our herd-building program. The cows are expected to freshen in the spring and summer of 2012, during which time we will begin producing cheese and yogurt. We plan to only produce cheese and yogurt while the cows are on pasture. To produce these value-added products the farm will need to invest in some equipment, namely a tank for cooling milk, a boiler or hot water heater to heat the water for cheese making and sanitation, a sink, a cooler for aging cheese, and a refrigerator for storage. Additionally, because each cow requires 2 acres of pasture, Stephens Farm will have to look into leasing additional land for pasture to ensure that the growing herd has enough land. If we cannot find an organic creamery to ship our milk to, we will start shipping conventionally to ensure that we have some income from the milk that our cows are producing.

**Beef**

Come spring, Stephens Farm will have four steers ready for slaughter. It is expected that after the cost of slaughter, the beef produced will generate about $10,000 worth of income. There are another five steers that will be ready for slaughter in the winter of 2012, and it is expected that the beef from these steers will yield a similar level of income. In order for the beef to be high quality, we intend to finish them on grain, which will improve the fat content and flavor of the meat. This will require some research into where the farm can purchase Certified Organic grain.

**Pork**

Stephens Farm currently has four gilts and one young boar. Once the boar comes of age we intend to have him breed the gilts. Some of the piglets will be sold as feeder pigs, while others will be raised up for slaughter. Having pork in addition to beef will open up a profitable meat market for our farm. To raise healthy pigs we will have to set aside some pasture for the pigs and build a shelter for them in the field.

**Honey**

In late spring of 2011 Stephen Farm purchased two beehives. After purchasing the hives, we also received a Pollinator Habitat Grant through NRCS. This grant requires that the farm set aside 3 acres to plant perennial pollinator plants. Before May of 2012 we need to sow the species that have been suggested for our farm. These will likely be planted around the hive area, as well as on property located across the street from the farm that is unfit for pasture or produce. It is our intention to plant pollinator plants that function both as pollinator food, as well as a marketable good. For example, many herbs, cut flowers, and fruit plants are good food sources for pollinators, so we would like to find a way to get pollinator benefits, as well as income benefits, from those species that we plant. The farm also plans on purchasing more hives for the spring of 2012.
Produce

After a number of years of coordinating CSAs, Stephens Farm would like to move away from this form of marketing. Due to the highly unpredictable weather over the past few years, rampant weed issues, and unneeded stress, Stephens Farm has decided to focus on creating a smaller scale, more successful Certified Organic produce operation. To do this, we will plant a small market garden that will provide us with summer crops for ourselves and for our farm stand. The farm will also direct its energies toward the planting and care of perennial crops and fall crops. Perennials, such as herbs, blueberries, raspberries, and strawberries, will require low levels of year-round maintenance, and will open up a market that we have yet to take advantage of. There is the potential for a “you-pick” berry business, and even an herb transplant business. In terms of annual crops, Stephens Farm will focus on fall crops, such as winter squash, garlic, potatoes, Indian corn, kale, broccoli, etc. This will allow us to devote the spring months to focusing on hay production, which is essential to a successful dairy operation. By downsizing the acreage of land used for produce, we will be better able to bale enough hay for the winter and early spring months.

Workshops/Programs

Another component that Stephens Farm would like to add into its business plan is the hosting of farm workshops and community events. Workshop topics would include: honey harvesting, composting, cheese and yogurt making, and a workshop explaining the meaning of Certified Organic. Events would be held in the spring, mid-summer, and fall, and each would be centered on that phase of the growing season (planting, growth, and harvest). They would be focused on family friendly events that are educationally driven, but have a number of fun activities. Through workshops and events such as these, Stephens Farm would be bringing more people to farm, increasing its publicity, building its social capital, and, ultimately, expanding its customer base. We want to appeal to those individuals who are looking for local, low-cost activities to do on the weekend.

Management

Stephens Farm, the business, is owned and operated by Ted and Annemarie Stephens. Janet R. Stephens, Ted’s mother, owns the 10-acre property, the barns, and the houses. We have rented/leased other property for over thirty years, and we presently lease 150 acres. As the business moves into the future, Ted and Annemarie’s four children will likely be more directly incorporated into the management side of the farm. Ideally each individual will have control over one aspect of the farm. For a possible example, Ted will be in charge of overseeing the dairy operation, Annemarie will handle the bookkeeping and marketing, Joshua and Nathaniel will be in charge of produce, hay, and machinery, Caitlan will have a role in organizing workshops and events on the farm, and Jennifer will be involved with livestock and lend a hand wherever she is needed. In short, this is a family business and the entire family will be involved.

Financial Plan

To accomplish our goals and ensure that our objectives are met, there will be some necessary expenses. To mitigate some of these costs, Stephens Farm intends to apply for a number of federally funded grants, namely the Value-Added Production Grant and a grant for permanent
In addition, the farm intends to slaughter a number of steers in the spring and the income from the beef should cover the farm’s FSA loan payment, as well as some of these projected expenses. As the pregnant cows give birth, the farm will also be able to venture into microdairy cheese production, and we intend to start shipping our extra milk through any creamery that is willing to come pick it up from our farm. It is our hope that cheese making will be a good supplement to the milk check every month.

At present these costs are still being researched, but the financial plan portion of this business plan should be complete by January 2012.

<table>
<thead>
<tr>
<th>Equipment and Other Needs</th>
<th>Estimated Cost</th>
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</thead>
<tbody>
<tr>
<td>Permanent Fence</td>
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</tr>
<tr>
<td>Cheese Making Equipment</td>
<td>$8000 max</td>
</tr>
<tr>
<td>Manure Spreader</td>
<td>$1,000</td>
</tr>
<tr>
<td>Dump Trailer</td>
<td>$3,000</td>
</tr>
<tr>
<td>Hay Rake</td>
<td>$2,500</td>
</tr>
<tr>
<td>Land for pasture and hay</td>
<td>$2,000</td>
</tr>
<tr>
<td>Seed: cover crop, produce</td>
<td>$300</td>
</tr>
<tr>
<td>Perennial crops: berries, rhubarb, herbs</td>
<td>$250</td>
</tr>
<tr>
<td>Beehives</td>
<td>$350 max</td>
</tr>
<tr>
<td>Certified Organic Grain for steers</td>
<td>$1,500</td>
</tr>
<tr>
<td>Certified Organic Hay for cows</td>
<td>$3,000</td>
</tr>
<tr>
<td>Liability Insurance</td>
<td>$800</td>
</tr>
</tbody>
</table>
Appendix B: Flyers for Farm Events

Stephens Farm will be hosting an open house on Sunday, August 21st 2011 and we would love to see you there!

Stephens Farm Open House

Have you ever wondered what Certified Organic really means?

Do you want to learn about where your food comes from?

Have you ever wanted to meet a cow?

If you answered yes to any of these questions, come to the Stephens Farm Open House for a fun, hands-on learning experience!

Activities include:

• Farm tour – enjoy a guided tour of a working certified organic farm
• Meet the critters– meet our lovely cows, pigs, chickens and honeybees!
  • Compost education – learn what goes into good compost
  • Planting activities, and much more!

When: Sunday, August 21st, 2011 at 2:00 PM

Where: Stephens Farm
467 State Route 284
Sussex, NJ 07461

Cost: $5.00 suggested donation
Please RSVP by Friday August 19th by phone: 973-875-2849, or email: stephensfarmnj@aol.com
Stephens Farm

Fall Field Day

Saturday October 1\textsuperscript{st} 1:00 – 4:00 PM

Come to the farm for an afternoon of fun, hands-on learning!

Activities will include:

Farm tour
Meet the animals
Pumpkin Painting
Story Time
Games and much more!

Where: Stephens Farm
467 Route 284
Sussex, NJ 07461

Cost: $5 suggested donation per person

Please \textbf{R.S.V.P.} by Wednesday, September 28\textsuperscript{th}, 2011 by phone: 973-875-2849, or by email: stephensfarmnj@aol.com
## Appendix C: List of Suggested Pollinator Plants from NRCS

<table>
<thead>
<tr>
<th>Scientific Name</th>
<th>Common Name(s)</th>
<th>Flowering Period</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Agastache foeniculum</em></td>
<td>anise hyssop, blue giant hyssop</td>
<td>July - August</td>
</tr>
<tr>
<td><em>Ageratum houstonianum</em></td>
<td>ageratum</td>
<td>summer - fall</td>
</tr>
<tr>
<td><em>Aster spp.</em></td>
<td>aster</td>
<td>summer</td>
</tr>
<tr>
<td><em>Baptisia tinctoria</em></td>
<td>Yellow Wild Indigo</td>
<td>April - June</td>
</tr>
<tr>
<td><em>Borago officinalis</em></td>
<td>common borage</td>
<td>late spring - early fall</td>
</tr>
<tr>
<td><em>Calendula spp.</em></td>
<td>calendula, marigold</td>
<td>blooms repeatedly</td>
</tr>
<tr>
<td><em>Chrysanthemum spp.</em></td>
<td>mums</td>
<td>summer</td>
</tr>
<tr>
<td><em>Coreopsis lanceolata</em></td>
<td>Lance Leaved Coreopsis</td>
<td>May - July</td>
</tr>
<tr>
<td><em>Echinacea purpurea</em></td>
<td>purple coneflower</td>
<td>mid-summer</td>
</tr>
<tr>
<td><em>Eupatorium coelestinum</em></td>
<td>Mistflower</td>
<td>July - October</td>
</tr>
<tr>
<td><em>Helianthus spp.</em></td>
<td>Sunflowers</td>
<td>July - October</td>
</tr>
<tr>
<td><em>Lavandula spp.</em></td>
<td>lavender</td>
<td>throughout summer</td>
</tr>
<tr>
<td><em>Monarda fistulosa</em></td>
<td>bee balm, wild bergamot</td>
<td>May - September</td>
</tr>
<tr>
<td><em>Pycnanthemum spp.</em></td>
<td>mint</td>
<td>July - August</td>
</tr>
<tr>
<td><em>Rudbeckia spp.</em></td>
<td>rudbeckia</td>
<td>summer</td>
</tr>
<tr>
<td><em>Tanacetum parthenium</em></td>
<td>feverfew</td>
<td>June - August</td>
</tr>
<tr>
<td><em>Zinnia spp.</em></td>
<td>zinnia</td>
<td>summer</td>
</tr>
</tbody>
</table>
# Appendix D: List of Donated Plants from CCE-Orange County Master Gardeners

<table>
<thead>
<tr>
<th>Plant List</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Common Name</strong></td>
</tr>
<tr>
<td>------------------</td>
</tr>
<tr>
<td>Spearmint</td>
</tr>
<tr>
<td>Chocolate Mint</td>
</tr>
<tr>
<td>Peppermint</td>
</tr>
<tr>
<td>Orange Mint</td>
</tr>
<tr>
<td>Garden Mint</td>
</tr>
<tr>
<td>Lemon Balm</td>
</tr>
<tr>
<td>Lemon Thyme</td>
</tr>
<tr>
<td>Rosemary</td>
</tr>
<tr>
<td>Tarragon</td>
</tr>
<tr>
<td>Borage</td>
</tr>
<tr>
<td>Coreopsis</td>
</tr>
<tr>
<td>Calendula</td>
</tr>
<tr>
<td>Agastache</td>
</tr>
<tr>
<td>Salvia</td>
</tr>
<tr>
<td>French Lavender</td>
</tr>
<tr>
<td>Red Shiso</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Echinacea</td>
</tr>
<tr>
<td>Oregano</td>
</tr>
<tr>
<td>Hardy geranium</td>
</tr>
<tr>
<td>Sweet Marjoram</td>
</tr>
</tbody>
</table>
Appendix E: Timelines and Lesson Plans for Farm Events

Farm Education Day
Saturday August 6th, 2011
11:00 am – 1:00 pm

11:00  Introductions
       Begin Farm Tour

11:15  Stop 1: The Front Field
       Activities:
         Pull pigweed
         Plant Identification

11:30  Stop 2: The Barn
       Activities: Meet the Animals
         Feed the pigs pigweed
         Look for a cow to pet

12:00  Stop 3: The Sensory Garden
       Activities: Garden Exploration
         Farm Detective Bingo
         Taste Test
         Catch insects in jar to get a closer look

12:30  Stop 4: The Greenhouse
       Activities: Plant a marigold

12:45  Stop 5: Picnic Table
       Activity: Read The Big Red Barn by Margaret Wise Brown
Stephens Farm Open House
Sunday August 21\textsuperscript{st}, 2011
2:00 pm – 4:00 pm
Suggested Donation: $5.00

2:00 Introductions
Begin Farm Tour

2:15 Stop 1: Front Field
Activities:
Pick green beans
Pull out pigweed and lambsquarters

2:30 Stop 2: The Barn
Activities:
Feed the pigs pigweed
Feed the chickens some grass clippings
Talk about what foods we like to eat compared to what the animals like to eat

2:50 Stop 3: The Sensory Garden
Activities:
Garden Scavenger Hunt
Taste Test of mint, nasturtiums, basil
Smell test of other plants

3:10 Stop 4: The Picnic Table
Activities:
Story Time: Read \textit{The Farmer} or \textit{Click, Clack, Moo}
Craft: Drawing favorite animal to make into magnet

3:40 Stop 5: The Greenhouse
Activities:
Plant Marigolds to bring home
Say hello to Brandy (the dog)
Stephens Farm Fall Field Day
Saturday October 1st, 2011
1:00 pm – 4:00 pm
Suggested Donation: $5.00

1:00 Meeting and Greeting
   Nametags

1:15 Introductions
   Begin Farm Tour

1:30 Stop 1: The front field
   Activities: Compost Making
   Look for earthworms
   Examine whatever plants might be left
   Pull out pigweed

2:00 Stop 2: The barn
   Activities: Meet the animals
   Feed the pigs pigweed
   Learn about chickens, feed them
   Pet a cow, show machine for milking
   Game: Food Chain Game

2:30 Stop 3: Sensory Garden
   Activities: Brown Bag botany
   Parts of a Plant
   Taste, touch, smell, see, listen
   Gourd Hut

3:15 Stop 4: Pumpkin Field
   Snack: Apple Cider and apples or cookies
   Activities: Pumpkin picking
   Pumpkin Painting
   When done painting pumpkin: Scarecrow making or butter shaking
   Game: Three sisters tag

4:00 Ending discussion
   Conduct survey
Appendix F: Lesson Plans for Select Curriculum Activities

*Meet the Animals*

**Objectives:** Introduce students to the various animals living on the farm.

**Site Requirements:** A barn with a variety of animals, hay bale seating within the barn

**Time Frame:** 1 hour

**Materials:** Journals

**Procedure:**

1. Before bringing students into the barn, explain the rules: no screaming, no running, and no touching or feeding the animals unless they have been told they are allowed to. Also caution students about manure.

2. Show students where the different animals live in the barn. Point out how the pigs burrow, and the cows chew their cud. Demonstrate milking one of the cows, and talk about baby animals.

3. After meeting all the animals, have students sit on hay bales in the center aisle and draw their favorite animal in their journal, and write what they liked most about it.

**Extension:** What’s the Difference?

**Objective:** Hone students’ differentiation skills.

**Procedure:** Ask students to act out their favorite farm animal in a game of farm animal charades, and see if their classmates will be able to guess what their favorite is without the actor making any noises.

*Reading of The Big Red Barn by Margaret Wise Brown*

**Objective:** Read children a book to expand their vocabulary and build upon the knowledge of farms that they have already obtained.

**Time Frame:** 15 minutes

**Materials:** *The Big Red Barn* by Margaret Wise Brown

**Procedure:**

1. Gather students into sitting a circle.

2. Read story to students, stopping to ask questions such as: “How many dogs are on this page? Can you see where all the mice are hiding? What do you think happens at night?”

3. When the story is over, ask the students what they liked best about the book: the illustrations? The animals?
**Farm Detective Bingo**

**Objective:** To develop students’ observational skills and allow them to explore the farm in a hands-on way. (Grades K-4)

**Site Requirements:** Garden or other safe area for children to explore

**Time:** 20 minutes

**Materials:**
- Laminated bingo cards (See attached)
- Clipboards
- Grease pencils or dry erase markers

**Procedure:**

1. Photocopy and laminate the “Farm Detective Bingo” card, or create a card of your own to give to students
2. Divide students into small groups, each with a chaperone. Each group will receive a card and a grease pencil or marker to carry with them around the farm as they hunt for the items on the Bingo card. The goal will be to make a straight line on the card for “Bingo.”
3. Set boundaries for the scavenger hunt, and the amount of time the students will have.
4. Send the students out to collect as many items as they need to make a straight line on their Bingo card.

**Extensions:** Have groups try to fill in the entire board.

# Farm Detective Bingo

As you explore the farm, look for the items below. Mark the box with an X once you've found the item. Call out "BINGO" when you've found and marked 5 items in a row — horizontally, vertically, or diagonally.

<table>
<thead>
<tr>
<th>Find an insect</th>
<th>Find something that has been nibbled</th>
<th>Find food for a plant</th>
<th>Find food for an animal</th>
<th>Find something red</th>
</tr>
</thead>
<tbody>
<tr>
<td>Find a sprouting seed</td>
<td>Find something made by the sun</td>
<td>Find food for a worm</td>
<td>Find part of an evergreen tree</td>
<td>Find something yellow</td>
</tr>
<tr>
<td>Find a worm</td>
<td>Find something that needs water</td>
<td>Find something green</td>
<td>Find another insect</td>
<td>Find something prickly</td>
</tr>
<tr>
<td>Find a whole leaf</td>
<td>Find something that smells sweet</td>
<td>Find a flower</td>
<td>Find something brown</td>
<td>Find something white</td>
</tr>
<tr>
<td>Find a rock</td>
<td>Find something dry</td>
<td>Find something mushy</td>
<td>Find a twig</td>
<td>Find a seed</td>
</tr>
</tbody>
</table>

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The Food Chain Game

Objective: Using pictures and visual representations of the different members of the food chain, participants learn that they, as well as all living things are part of a complex system of eating and growing. They also learn the importance of each member of the food chain.

Site Requirements: A large area that is safe for participants to move and run around in.

Age Group: K – 5

Time Frame: 15 to 30 minutes

Materials:
- Pictures or objects representing:
  - The sun
  - Water
  - Soil
  - Seeds
  - Plants
  - Flowers
  - Bees
  - Cow
  - Milk
  - Honey
  - Farmer
  - People

Procedure:

1. Give one picture to each participant.
2. Ask the participants to put themselves in order of the food chain (Prompt: “who eats who?”).
3. Once in order, have the participants form a circle. Discuss the life cycle and flow of energy in a food chain.
4. Have each participant give a reason why the image that they’re holding is important to the cycle. Talk about what would happen if one of the members is removed from the circle. How will this effect what other animals eat? What about what people eat?

Extension: Identify the producers, primary consumers, secondary consumers, and decomposers in the circle.

**Brown Bag Botany**

**Objective:** This activity introduces participants to the different parts of a plant using edible examples from real plants. The participants then discuss ways that they eat the different plant parts.  

**Site Requirements:** Garden or greenhouse space with samples of different edible plant parts.  

**Age Group:** All Ages  

**Time Frame:** 20 – 30 minutes  

**Materials:**  
- Large brown paper bag  
- Labels to identify different plant parts (root, stem, leaf, flower, bud, fruit, seed)  
- An example of each type of plant part (See Plant Part Chart)  
  - Roots: potato, carrot, garlic, beets  
  - Stems: celery, asparagus  
  - Leaves: lettuce, swiss chard, spinach  
  - Flowers: nasturtiums, marigolds  
  - Buds: broccoli, cauliflower, artichoke  
  - Fruit: cucumber, tomato, zucchini, peppers  
  - Seeds: rice, corn, shelled beans and peas, coffee

**Procedure:**

1. Set up and label seven stations, one for each plant part.  
2. Fill the brown paper bag with assorted edible foods from each category, including animal and people food from your own farm.  
3. Have participants each pull an item out of the bag. Then ask them to place the food at the station of its corresponding plant part. For example, lettuce would be placed in the “Leaves” station.  
4. When each participant has chosen a station for their food, come together to review and critique the choices that were made.  

### Plant Part Chart

<table>
<thead>
<tr>
<th>Plant</th>
<th>Description</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Root</td>
<td>Usually forms below ground, acts as an anchor for the plant, absorbs water and minerals, and provides physical support and food storage.</td>
<td>Diakon, burdock, tapioca, carrots, parsnips, beets</td>
</tr>
<tr>
<td>Stem</td>
<td>Provides support for the buds and leaves, and gives the plant its form. Serves as a conduit for water, minerals, gases, and sugars.</td>
<td>Potatoes, celery, rhubarb, asparagus</td>
</tr>
<tr>
<td>Bud</td>
<td>An undeveloped shoot from which leaves or flowers grow. A flower bud includes a short stem with embryonic flower parts.</td>
<td>Broccoli, artichokes, brussel sprouts, cauliflower</td>
</tr>
<tr>
<td>Leaf</td>
<td>The part of the plant involved in photosynthesis and transpiration. Leaves are made up of: stoma, guard cells, epidermis, cuticles, veins, chlorophyll, and chloroplasts.</td>
<td>Parsley, onions, celery, lettuce, mint, chives, garlic, tea</td>
</tr>
<tr>
<td>Flower</td>
<td>The structure that contains the organs for sexual reproduction. Also the site where the pollination occurs.</td>
<td>Nasturtiums, chamomile</td>
</tr>
<tr>
<td>Seed</td>
<td>After pollination has occurred, fertilized ovules grow and swell to form seeds. A seed contains an embryo (which has all the necessary genetic information to create a new plant), an endosperm (the food required to sustain early growth), and a seed coat (which protects the seed from disease).</td>
<td>Shell peas, wheat products, oats, coconut, peanut butter, corn starch, coffee, dried beans, chocolate</td>
</tr>
<tr>
<td>Fruit</td>
<td>The enlarged ovary surrounding the newly developed seed is the true fruit of the plant. The fruit holds and protects the seed.</td>
<td>Pumpkins, tomatoes, vanilla, snap peas, green beans, avocados, peaches, grapes, zucchini, peppers</td>
</tr>
</tbody>
</table>
Appendix G: Photos of the Farm and Garden

Photo 1. The month of May was a very wet one.

Photo 2. Sprout and his mom BeBe
Photo 3. A flea beetle on a heavily chewed leaf of kale.

Photo 4. Six’s bull calf looks out between the fence rails.
Photo 5. One of the many plants donated to me – it smells like peppermint patties.

Photo 6. A small bee on a calendula flower.
Photo 7. A donated rosemary plant soaking up the sun.

Photo 8. The first zucchini of the season.
Photo 9. Hot and fluffy

Photo 10. A froggy visitor on our windowsill.
Photo 11. A row of cucumbers.

Photo 12. A young cucumber on the vine.
Photo 13. Green beans and blossoms.

Photo 15. The sensory garden in July.

Photo 16. The garden being put to use in October.