2018

A Comparison of Three Agricultural Startups

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A COMPARISON OF THREE AGRICULTURAL STARTUPS

By

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Portfolio

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Introduction: The Central Theme of This Portfolio

The theme of this portfolio is alternative agricultural startup career options for new, young, educated farmers, including myself. For this portfolio I am considering three possible options for agricultural startup careers. They include: (1) managing a student farm or school garden, (2) independent farm consultant (or extension agent), offering expert advice, guidance and support to farmers, and (3) owning and operating a small organic farm. While there are other career options in agriculture, such as being a farm worker or a farm manager, I am focusing on these three options as they are the career options I am considering for myself.

The first component of my portfolio is a review of the literature on student farms and school gardens. The purpose of this review of literature is to inform myself and others about the history, current status, and factors involved in creating a successful student farm or school garden. This component of my portfolio was interwoven with a position I held in the Summer of 2017 working for Interlochen Academy of the Arts where I helped establish a school garden. The review of literature was presented to Interlochen administrators to help them plan the future of their school garden project.

The second component of this portfolio is the result of having the opportunity to be an independent farm consultant for Food For Thought, a small, private, for-profit business that has a certified organic food production facility in Traverse City MI. At their request I developed a plan for the annual production of 4000 pounds of high tunnel raspberries, which included a crop enterprise budget.

The third component of my portfolio, which pertains to owning and operating a small organic farm, is composed of the farm business plan I completed for a FSA Beginning Farmer Loan to help establish the farm I am currently operating in Traverse City MI.

After presenting the three components of my portfolio I will provide a thorough reflection on my experiences with each of these agricultural startup career options, how they have impacted me personally and professionally, and define the direction I am going to pursue regarding my career after graduate school.

What Led to the Central Theme in my Portfolio

Before presenting my portfolio, I would like to provide some background information on myself and how each of these independent components came to be a part of this portfolio.

When I graduated from Michigan State University with an undergraduate degree in Sustainable and Organic Horticulture I knew that I wanted to attend graduate school but that I should take some time off to gain some agricultural experiences outside of school to help me determine where I wanted to go with my career. I spent my first summer after graduating from college growing annual vegetables on a ½ acre plot and selling them through a small CSA and the local farmers market. Two years later the farm had grown to two acres of vegetable production, I had a business partner, six hoophouses, three seasonal employees, and over $100k in gross sales. I loved farming but I felt burnt out, under paid, and isolated.

After I experienced first-hand all that is involved in starting up a small scale organic farm, I realized that I wanted to do more than just farm for myself. I wanted to help other farmers succeed in their horticultural endeavors. I was interested in teaching others how to successfully start up their own farm. And I wanted to help other young farmers not feel burnt out, underpaid, and isolated so they would continue to farm. Thus, I knew that there was more to learn and that it was time to attend graduate school.

When I was fortunate to receive a teaching assistantship for the Environmental Studies Program at the University of Montana in fall 2016 and spring 2017 I gladly accepted. I felt like

this program was going to be a good fit. Looking back, I can say that it was a great fit, and I am very happy that I am completing this program.

When I moved to Montana for the EVST program I had no intention of returning to my previous farm, Spirit of Walloon, or to Michigan for that matter. But I always knew it was an option. I was excited to begin a new chapter in my life yet it was reassuring to know that I would still be connected to farming through the PEAS farm and my advisor Josh Slotnick.

It wasn't until the personality survey/reflection during our cohorts weekend retreat that it came to me that working and owning a farm was something that I am simply meant to do. Everything about that survey told me that I had to be on a farm. Undoubtedly, there is something about farming that I simply can't resist. Thus, I found myself looking for farm property close to back home, specifically in Traverse City, MI.

As I went into the Summer of 2017 I had my eyes set on a piece of farmland, along with an Internship with MSU Extension doing Hops research, and an independent consulting job working with the local business Food For Thought to develop an agricultural plan for their new production site that would be heavily tied to community agricultural projects.

Everything changed throughout the summer, I acquired the farmland I had been dreaming about. I took a job offer to help Interlochen Center for the Arts establish a school garden and greenhouse which required me to give up the Internship with MSU Extension. And, Food for Thought continued to scale back on their plans for an agricultural project and lost almost all immediate interest in community agriculture projects.

By the end of the summer I realized I had my three components for my portfolio, student farm or school garden startups, independent consultant for other for-profit small farm startups,

and starting up my own small farm, all related to agricultural startups, all potential career options for myself and others with a similar education, and all happening in the summer of 2017.

Part One

Edible Education: A Review of the Literature on the Student Farm and School Garden Movement in Higher Education and K-12

The student farm and school garden movement has been gaining significant support as education focused farms and gardens have been developed in schools across our country. Student farms and school gardens engage students in experiential food system education. According to Hassanein (2003, p. 78), "thoughtful practice of pragmatic politics and the development of a strong food democracy will be keys to transformation of agri-food systems in the long run." Student farms and school gardens are essential to this transformation. "At the core of food democracy is the idea that people can and should be actively participating in shaping the food system, rather than remaining passive spectators on the sidelines" (Hassanein, p. 79). In my opinion, there is no better way to elicit active participation in shaping the food system than through student farms and school gardens. Student farms and school gardens are "enormously enriching, empowering, and life-changing experiences" (Sayre, 2011, p. 7). Student farms and school gardens help students pursue "life choices to positively affect our contemporary food system" (Sayre, 2011, p. 7). For these reasons, this paper will review the literature on student farms and school gardens in higher education and K–12. The paper's goal is to inform school administrators, faculty and staff, student farm managers, and parents and students about student farms and school gardens so that they might use this information to start and maintain a successful student farm or school garden on their campus.

I will begin by discussing the student farm movement in higher education. I will discuss: (1) history and current status of the student farm movement; (2) shared attributes of student farms; (3) factors predicting success of student farms; and (4) challenges of student farms.

Following the discussion of student farms in higher education, I will discuss school gardens at the K-12 levels. I will discuss: (1) the history of k-12 school gardens; (2) the educational, social, and behavioral outcomes of K-12 school gardens; (3) the most famous K-12 school garden program, The Edible Schoolyard; (4) the case for more student gardens in high schools; and (5) the challenges for school gardens. Finally, I will provide a list of recommendations for starting and maintaining a successful student farm or school garden. If the movement is to take hold and grow, it is critical that all who are stakeholders in our educational system have a better understanding of the potential positive impacts this movement could have on the education of America's next generation and the creation of a food democracy.

The Student Farm Movement in Higher Education

Student farms in higher education - also called school farms, college farms, campus farms, student organic farms, student educational farms - can be defined as, "farms that physically engage students in ways that teach them about crop production as well as direct marketing" (Rogers, 2012, p. 4). Most of the work from farm planning to crop harvesting and marketing is done by college and university students, usually in addition to student farm managers, volunteers and staff.

History and Current Status of Student Farms

Student farms are not a fad, they have deep roots across North America. The first student farms were established in the late nineteenth century. Student farms became more widespread in the counterculture movement of the 1960s and 1970s. With the recent interest in sustainability,

local food, and climate change starting in the 1990s, student farms are experiencing a radical revival. The number of student farms around the country has dramatically multiplied in the past few decades (Hyslop, 2015).

LaCharite (2015) used a comprehensive search of all student farm directories and word of mouth to identify colleges and universities with student farms and found that the number of student farms on college campuses in the United States has grown from an estimated 23 in 1992 to 353 in 2015. Around half of student farms were established between 2005 and 2010. As can be seen, this movement has grown tremendously in a short period of time. According to Sayre (2003), the recent growth of student farms is driven primarily by overwhelming student interest and demand.

Shared Attributes of Student Farms

Student farms differ from university research and extension farms associated with traditional land-grant colleges of agriculture. Student farms can be found at a variety of institutions of higher education, including land-grant universities that have a college or school of agriculture and a university research and extension farm. They can also be found at universities which are not land-grant institutions and do not have a college or school of agriculture. The University of Montana PEAS (Program in Ecological Agriculture and Society) Farm is a good example.

The primary focus of student farms is teaching farming knowledge and skills, which is important because the majority of students at both agricultural and non-agricultural colleges and universities today come to higher education without previous farm experience (Sayre, 2011). As stated by Carlson (2008, para. 4), "It's a safe bet that many Americans have never set foot on a working farm and have no clue how farmers coax the most common vegetables out of the

ground." For four reasons, the emphasis on farming knowledge and skills is necessary to provide the human capital needed for present and future agricultural production.

First, there is a need for more farmers. Presently, 30% of United States farmers are over the age 65; 5% are under age 35 (Kirschenmann, 2011). The average American farmer is over 60 years old. The 2014 census indicated that the number of farmers, save the oldest, shrunk by double digits in the last decade (Dewey, 2017). In the next 15 years, 50% of America's agriculture equity is going to change hands (Farmers for America, 2017). As stated by Kirschenman (2011, p. xv): "one simply cannot project these trends very far into the future without concluding that we are headed toward a very serious human capital problem in U.S. agriculture." It is not only a human capital problem but a food security problem. Unless, we grow more farmers we will not be able to have a reliable source of affordable, nutritious food.

Second, student farms typically introduce students to alternative, sustainable agricultural practices. Whether a consumer or a future farmer, students must realize that we are depleting our natural resources at an alarming rate and that our present large, specialized and industrialized agricultural system requires ever increasing amounts of herbicides and fertilizers, which in turn requires enormous amounts of energy as well as increased amounts of water. The bottom line is that large scale industrialized agriculture cannot be sustained without cheap energy, abundant freshwater, and climate stability (Kirschenmann, 2011). These resources are in steep decline. Thus, future farmers are needed who are educated to run ecologically sustainable farms.

Third, there is a new generation of students interested in alternative agriculture. They are interested in and want to connect with their food. They want to learn about raising animals and growing vegetables (Farmers for America, 2017). According to a recent Washington Post article (Dewey, 2017), the number of farmers under 35 years old is increasing. The number of farmers

between the ages 25-34 grew 2.2% between 2007 and 2012, in some states the number of beginning famers has grown by 20% or more. These new farmers are diversified, 30% women, 10% Hispanic, and there are more African American and native American farmers. The number of highly educated, ex-urban, first time farmers is increasing. The fact that many of these young farmers are entering farming speaks volumes to the need and desire to introduce students from a variety of academic areas to small scale sustainable farming practices. Student farms are doing just that.

Fourth, there is a new generation of young people interested in eating healthy, local, sustainably-produced food. They include young families with small children who want to raise healthy kids (Farmers for America, 2017). This provides opportunities for a new generation of farmers who are more likely to grow food organically or use sustainable food practices. Already about 8% of US farms market foods locally, through direct-to-consumer and intermediated sales and these numbers are increasing. Young farmers are more likely to be deeply involved in their local food systems via CSAs and farmers' markets (Dewey, 2017).

Student farms do not just have a commitment to growing farmers. Student farms also have a commitment to increasing student leadership and environmental sustainability. Sayre and Clark (2011), when discussing the key attributes of student farms, state: "first, there must be some level of student initiative or possibilities for student leadership associated with the farm; second, there must be a degree of attention and concern paid to questions of environmental stewardship and sustainability" (p. 6). Many people argue that the most important lessons learned on the farm are about growing people: learning responsibility, flexibility, perseverance; gaining problem-solving skills, and looking at the world in different ways (Hyslop, 2015). In addition to teaching sustainable agriculture skills, student farms typically foster campus

sustainability projects, such as recycling of food wastes and provision of local food for dining halls, such as Michigan State University's Bailey Greenhouse which supplies fresh greens for the freshman dorms.

There are additional shared characteristics of student farms. Most student farms have a commitment to building community. There is often a community service element where students grow food to donate to local food banks, install gardens at nearby secondary schools, host farm tours for elementary school groups, and similar initiatives (Sayre & Clark, 2011). Many offer youth programs and programs for the general public. Many provide farm-based education opportunities for children and adolescents from K-12 schools in the area (Rogers, 2012).

All student farms provide experiential learning. They emphasize hands-on experience not just in production but also in marketing food (typically through CSAs and farmers' markets) (Sayre, 2003). This hands-on experience is often linked to more formal academic work in a variety of disciplines.

Student farms have a commitment to a liberal arts education. Teaching sustainable agriculture skills lends itself to an interdisciplinary education. As stated by Carlson (2008, para. 7), "Modern agriculture touches on nearly all of the pressing environmental and social issues facing America today -- water, energy, immigration, biodiversity, public health, rural poverty, suburban sprawl, climate change, and even religion and ethics." Similarly, David Orr (1991), professor of environmental studies at Oberlin College, argued that environmental issues are relevant to all undergraduate disciplines--literature, history, science, politics--and that one of the best places to demonstrate this to students is on campus farms.

Thus, the goal of many student farms is to create critical thinking and problem solving skills. As stated by Scott Stokoe, manager of the Dartmouth College Organic Farm, "I think of

the farm as an agent of change. A place where students can identify problems and figure out how to fix them" (Sayre, 2003, para. 1). Smith, who helped establish the student farm at the University of Wyoming, listed for The Chronicle of Higher Education the many things his students learn from the student farm. The list included: how to work within a university bureaucracy; write grant proposals; work in groups; plan a business; market a product; and, "oh yeah, how to grow vegetables and all that entails, from soil fertility to pest management to planting and harvesting methods" (Carlson, 2008, para. 10).

Evidence that student farms have different goals from traditional land-grant college of agriculture farms is provided by LaCharite (2016). LaCharite surveyed 300+ student farm directors about the level of importance of 30+ pedagogical objectives for their student farm (rated on a 4 pt. scale; 1 = not important to 4 = very important). The results clearly indicate that student farms have multiple pedagogical goals, the most important was to teach practical skills in growing food ($\bar{x}$ = 3.66; sd = .61). However, also high on the list of goals were issues related to sustainability: teach sustainability through agriculture ($\bar{x}$ = 3.56; sd = .71), establish sustainable agriculture practices, ($\bar{x}$ = 3.49; sd = .72), raise awareness of environmental issues ($\bar{x}$ = 3.46; sd =.73), make connections between agriculture systems, the environment and human health ($\bar{x}$ = 3.33; sd = .80), and teach environmental attitudes ($\bar{x}$ = 3.09; sd = .86). Fostering a sense of belonging was also important ($\bar{x}$ = 3.07; sd = .97), as was establishing interdisciplinary learning ($\bar{x}$ = 3.07; sd = .97). Teaching farm management skills, a goal of traditional agriculture farms, was of less importance ($\bar{x}$ = 2.39; sd = 1.06). Student farms are typically open to all students, regardless of major (Sayre, 2003). LaCharite (2016) found that 95% of student farms are open and accessible to students regardless of major through volunteering, classes, research or employment.

Finally, student farms are physically relatively small. LaCharite (2016) found that student farms range from under a half acre to over a thousand acres. Nearly 44% were under a half acre, 16% were between a half acre and an acre, 24% were between one and five acres with significantly less reporting more than 6 acres. Thus, 60% are an acre or less.

To summarize, the goals of student farms are to grow farmers, to teach alternative agriculture skills in the context of a liberal arts education (to grow people), and to teach environmental sustainability and to build community. As Sayre (2003) states:

> All student farms are united by a set of educational principles: that students can and should develop manual skills alongside intellectual power; that the campus is a community rooted in place and strengthened by non-academic activities and relationships; and that farm work can give students a practical perspective on a wide range of ecological, economic, and social issues (para. 7).

Nationwide, these farms are as diverse as the students who work them and the lands they occupy. Some are run as community-supported agriculture programs; others supply dining halls or sell at farmers' markets. Some are certified organic; others follow organic or sustainable methods but are not certified. Some are overseen by a full-time staff person; others are loosely supervised by professors of ecology or plant and animal sciences. Many are linked to courses in subjects like ecological agriculture, organic gardening, sustainability, or global food politics (Sayre, 2003). The degree to which they train farmers versus provide a liberal arts education varies but all do both to some degree.

Factors of Success

Hyslop (2015) provides an in-depth look at student farms at 10 universities across the country.[1] This article provides information on the farm site, history, and courses associated with each of these student farms. As the student farms in this report show, there is no one recipe to a successful student farm and no single set of rules for starting or running a student farm. There is

diversity in how and when the farms were started, how they are managed, and how they are integrated within the university.

Similarly, Sayre and Clark's edited book *Fields of Learning* (2011) contains in-depth information on fifteen student farms at colleges and universities across the US and Canada. Each chapter is about a student farm and is written by a faculty or staff member who helped establish the student farm or has been directly involved with it for many years. Each chapter describes the farm's history, evolution, organization and rationale. Chapters are organized by date the student farm was established and Sayre and Clark argue establishment falls into four phases.

The first phase features farms established in the late nineteenth century or the early twentieth century. Three student farms are discussed in this section, Berea College (established 1871), the first student farm, and student farms at Wilmington College (established 1946) and Sterling College (established 1962). All these colleges draw on an educational principle that emphasizes a balance of physical and mental training. Several of them, including Berea, are federally recognized work colleges, meaning that all students are required to participate in college-run labor programs in exchange for tuition. The second phase includes farms established at colleges and universities during the 1970s. In this section, Sayre includes chapters on student farms at Evergreen State College, The University of Oregon, The University of California, Davis (the first student farm at a land-grant university), and Hampshire College, all founded in distinct ways and with a variety of objectives. The third phase reflects a maturation of the student farm movement in the 1990s, a period in which dozens of student farms were established. Four student farms are featured in this section: University of Maine, Central Carolina Community College, Prescott College and the University of Montana. These farms were established in a time of growing institutional recognition and support for sustainable agriculture. Some of these

student farms are an outgrowth of new undergraduate majors in sustainable agriculture. The final phase tracks student farms established since the 1990s co-occurring with the institutionalization of organic agriculture. Four programs are represented in this section: University of British Columbia, New Mexico State University, Michigan State University and Yale University all illustrating a variety of responses and challenges but each highly successful.

Three themes emerge (Sayre & Clark, 2011) in the descriptions of these college student farms: (1) the issue of funding, (2) striking a balance between student leadership and faculty or staff direction, and (3) the profound interdisciplinarity of student farming. Upon reading the stories of these student farms it becomes clear that there is no single recipe for a successful student farm. However, the editors provide a list of twelve key steps to student farm formation based on the combined wisdom from the essays in their volume. These steps will be reported at the end of this paper as I believe they are equally relevant for K-12 school gardens.

To my knowledge, there is only one study on the effectiveness of college and university student farms (there are many studies on the effectiveness of K-12 student gardens). Hassanein (2008) conducted research on participants involved in the University of Montana PEAS farm to explore the concept of food democracy. Hassanein found that students learn about food production including how to grow vegetables, including preparing the soil, transplanting and seeding, dealing with pests and weeds, rotating crops, and so on. Students also learned mechanical skills essential to growing vegetables, such as how to use irrigation equipment, how to use tools and machinery, and how to build things like greenhouse tables. Students also learned about the food system, including conventional, alternative, and local aspects of the food system. Another important result of the study was that students reported an increased sense of efficacy, particularly with respect to making decisions, as a result of working on the PEAS farm.

Through this experience, they gained confidence and trust in themselves and their abilities. However, more research needs to be conducted on the effectiveness of student farms in meeting the goals of student farms, including critical thinking and problem solving, and on the number of participants in student farms who go on to farm after graduation. As stated earlier, there is research indicating a surge in new, young, diversified, and highly-educated farmers. It would be nice to know how many of them got their start on a student farm.

In spite of the limited research on student farms, there are many arguments in favor of student farming. As stated by Hyslop (2015):

> First and foremost, student farms are educating the next generation of farmers. They are paving the way for the future of farming. Student farms provide a way for universities to demonstrate their environmental or sustainability ideals. Student farms also function as living labs, as areas to put theory into practice. Compared to traditional farms, they offer a better environment to experiment with alternative farming methods and innovative research. They help to prepare the next generation of farmers for the realities of farming in light of climate change. In the process, they are helping to prepare for a food revolution, shifting away from industrial monoculture to more sustainable practices (para. 2).

Challenges for Student Farms

The biggest challenge for student farms is resources; institutional support is often lacking (Kirschenmann, 2011). While the revenue generated by Community Supported Agriculture (CSA) programs, as well as students who work for credit, helps keep many of the student farm operations afloat in higher education, student farms vary widely in their institutional status and in their overall funding mechanisms. Some campus farms are independent enterprises that employ and train students in exchange for reduced rent or other benefits. Many are organized as student clubs, making them eligible for supplemental funding from student fees. A few are organized as non-profits and have secured grants for start-up costs or outreach programs. Some exist as freestanding entities with their own lines in the institutional budget (Sayre, 2003). The

University of Montana PEAS farm is a campus-community partnership; some of the funding comes from the University of Montana Environmental Studies Program, the farm is sub-leased for $1 a year from the City of Missoula which has a 40-year lease for the land from the Missoula County Public Schools, and some of the funding comes from CSA members and donors.

One of the challenges of running a student farm, as stated by Nancy Hanson, manager of the school farm at Hampshire College, is "dealing with the constant misunderstanding that you should be making money" (Sayre, 2003). A student farm's educational mission, Hanson argues, will often mean that it must be subsidized, since (for instance) it can't use labor as efficiently as a regular commercial farm. "I often have twelve people for two hours to do a job that would probably be quicker with four people for four hours. People are here to learn, so you have to take that into account" (Sayre, 2003). Scott Stokoe, manager of the Dartmouth College Organic Farm, likewise takes issue with the double standard often applied to campus farms, "The French Department doesn't support itself--so why should an educational farm?" (Sayre, 2003).

Some people question devoting land, financial resources and course hours to teaching students how to farm given the belief that we will need fewer and fewer farmers if conventional agriculture continues to predominate. After all, "the successful trend of industrializing agriculture during much of the twentieth century strongly suggests that we will need fewer and fewer farmers to produce all our food" (Kirschenmann, 2011, p. xiv). Kirschenmann argues that this reasoning has to be countered with the argument for the need for sustainable agriculture and the need for training in sustainable agriculture.

I have two experiences working on student farms, first as an undergraduate student on the Michigan State University Student Organic Farm and second as a graduate student on the University of Montana PEAS farm. My experiences working on student farms has not only

taught me the skills involved in small-scale organic agriculture; planting, growing, harvesting, storing and packaging organic produce; it has taught me about the conventional, industrial agricultural food system in the U.S. versus alternative, small-scale, local/regional food systems. It has made me an advocate for a sustainable food system. Through my experience on the MSU Student Organic Farm and the University of Montana PEAS farm, I have gained the knowledge and skill sets, and the confidence in my ability to own and operate a farm, that I have started my own small-scale organic farm and have consulted with several organizations on starting up a small-scale organic farm.

The School Garden Movement: K-12

Similar to the student farm movement in higher education, the school garden movement in K-12 has a deep and long tradition. Synonyms used for K-12 programs include: school gardens, children's gardens, garden-based education and garden-based learning. School gardens use an instructional strategy that utilizes a garden as a teaching tool and whose pedagogy is based on experiential education applied in the living laboratory of the garden (Rogers, 2012). "It encompasses programs, activities and projects in which the garden is the foundation for integrated learning, in and across disciplines, through active, engaging, real-world experiences" (Desmond, Greishop & Subramanim, 2002, p. 7). These experiences are limited to activities within a garden setting, which is usually smaller in size, complexity, and labor required as compared with a farm (Rogers, 2012).

There are a number of school garden programs and curricula including the Boston Schoolyards Initiative, the Common Roots Program in Vermont, Denver Urban Gardens, the Garden-Based Learning Program at Cornell, the Learning Gardens Laboratory in Portland Oregon, The Life Lab Science Program at Santa Cruz, the San Francisco Green Schoolyard

Alliance, the Edible Schoolyard in Berkley, the Garden Initiative in Chicago, Urban Harvest in Houston, the Junior Master Gardener programs in Texas, 4-H Youth garden programs, and the National Wildlife Federation Schoolyard Habitat Program across most states (Williams & Dixon, 2013). Although each program is unique, all engage school children with experiential and hands-on learning. All involve the following constructs according to school garden stakeholders sampled in one study: exploration and discovery; interactive, hands-on experiential learning which is specifically designed for children, allowing freedom of activity apart from adults; connection to and appreciation of the natural world, plants and food; and inculcating an environmental ethic (Miller, 2005).

School gardens are part of formal educational processes, and differ from children's gardens in public parks, botanical gardens/arboretums or recreational areas. The latter provide informal or non-formal agricultural education (Miller, 2005). In contrast, school garden curricula are designed to meet subject area standards, particularly for science, mathematics, language arts, nutrition, geography, literature and health science, along with skills acquisition (Williams & Dixon, 2013). School gardens have the potential to significantly contribute to the traditional K-12 classroom curriculum. School gardens can contribute to all aspects of education including academic skills, personal development, social development, and moral development, as well as vocational and life skills (Rogers, 2012). For school garden programs to be effective, however, they must be implemented across grade levels and tied to local, state, or national education standards (Rogers, 2012).

Farm-based education (FBE) or farm-based learning (FBL) are programs similar to school gardens; however, the instructional strategy utilizes a farm in the local community as a teaching tool. Thus, students leave the school for farm visits, workshops, etc. Often these farms

are student farms at colleges and universities. The advantage of school gardens is that the garden is on the school grounds. The advantage of farm-based education is that farms offer many more learning opportunities, such as livestock, compost, greenhouses, and larger-scale vegetable production, which offer the potential for more in-depth learning experiences about food and farming (Rogers, 2012).

School gardens integrate a wide variety of disciplines, and like student farms are an instructional and curricular strategy that utilizes a garden as a teaching tool based in the dual theoretical frameworks of experiential and environmental education (Subramaniam, 2003).

History of K-12 Student Gardens

The history of the school garden movement has a long tradition. In the United Sates the school garden movement reached high points during several different eras, mainly in response to school reforms. In the early twentieth century, progressive education and social reform movements stimulated the idea of school gardens. Progressive educators like John Dewey proposed integrating classroom learning and students' natural environment. School gardens were viewed as a practical way to connect children to nature and community. Dewey urged teachers to connect theory with practical experience, promoting learning by doing or hands-on learning. Children were not viewed as passive recipients of information but "active agents constructing their own reality and worldview in continuous interaction with their environment" (Knoll, 2014, para. 9). Dewey believed that children acquired knowledge and skills by experiencing life first-hand. Dewey introduced the notion of problem solving. Through the search for a solution to a real-life problem, Dewey believed children would learn, retain and retrieve information better than using traditional methods of memorizing and recitation. Thus, Dewey designed the curriculum into problems that were appealing and challenging for students and could be solved

by them experimentally, and, to a large degree, independent of adult supervision (Knoll, 2014). Dewey, through his Laboratory School at the University of Chicago, one of the most distinguished schools of the progressive education movement, strived to "lay the foundation for reforms that would revolutionize the education system, and over time, transform society into a great democratic community" (Knoll, 2014, para. 5). One of the most visible outcomes of this movement was the school garden movement, which flourished from 1890 - 1920 (Kohlstedt, 2008).

In the 1960s and 1970s, after a lull in school gardens, the counter-culture and environmental movements created a resurgence of interest in both student farms in higher education and school gardens in K-12. Starting in the 1990s a rebirth in progressive education coupled with renewed interest in environmental education and nutrition/health issues for children, school gardens gained prominence again (Rogers, 2012). In the first two decades of the 21st century, school grounds previously covered with asphalt or grass have increasingly becomes sites for school gardens. This resurgence of interest in school gardens has resulted in the establishment of thousands of school gardens in the U.S. Michelle Obama's planting and harvesting organic vegetables with children from local public schools at the White House has validated and reenergized the movement as did her general emphasis on nutrition and a healthy lifestyle.

Two major areas of public interest have reenergized the movement. First are issues of health, including obesity, food insecurity and food borne diseases. In the last decade we've seen all time high childhood obesity rates, waves of salmonella and *E. Coli* outbreaks, and an increase in Type 2 Diabetes among children (Williams & Dixon, 2013). In 2015, one in 13 US households, or 31.3 million adults and 6.4 million children, had low food security, while

approximately one in 20 U.S. households, or 10.9 million adults and 541,000 children, had very low food security (Coleman-Jensen, Rabbitt, Gregory, & Singh, 2016). Lack of money and other resources (e.g., living in food desserts) hinder food insecure households' ability to maintain consistent access to nutritious foods. Food insecurity has been linked to many negative health outcomes. Low-income, ethnic minority, and female-headed households exhibit the greatest risk for food insecurity, which often results in a higher prevalence of diet-related disease (Franklin, Jones, Love, Puckett, Macklin & White-Means (2012). The second issue is fueled by the "No Child Left Inside Coalition" in which school gardens are seen as the common denominator for children to gain outdoor learning experiences on school grounds (Williams & Dixon, 2013).

Effectiveness of School Gardens

Like student farms, school gardens have a multitude of purposes including personal, social, physical and moral development that includes self-concept, self-esteem and motivation; positive environmental attitude and empathy; increased food literacy and healthy eating habits; and school bonding, parental involvement and strengthening of community (Williams & Dixon, 2013). Williams and Dixon (2013) synthesized the empirical research on the impact of school gardens on academic outcomes using MIRS (methodological inclusive advancements in research synthesis). Forty-eight empirical studies conducted between the years 1990 and 2010 provided sufficient information on research design and findings to conduct the MIRS. The studies examined direct and indirect effects of school gardens on academic performance. The most frequently studied programs were the Junior Master Gardener program (13 studies); Schoolyard/Wildlife Habitat programs (n = 6), Project Green (n = 4), and locally adapted 4-H programs (n = 3).

Forty studies assessed direct learning outcomes and 83% of these studies found statistically significant positive effects of school gardens on learning outcomes. Studies on the effect of school gardens on science had the highest proportion of positive effects with 14 of 15 studies (93%) reporting a positive effect of school gardens on science. In addition, 80% of the studies on mathematics and 72% of the studies on language arts found positive outcomes. Two of three studies on the effect of school gardens on writing found positive outcomes, and the only study that examined social studies found a positive effect. Thirty-six studies assessed indirect academic outcomes. Across 55 outcomes (most studies measured more than one indirect outcome), 80% of the results were positive. Among indirect academic outcomes, social development was the most commonly assessed (13 studies) and 77% of the outcomes were positive. All of the studies on the effects of school gardens on motivation, curiosity and wonder, discipline, study habits, problem solving, life skills and academic attitudes were positive. Of the other outcomes reported in addition to direct and indirect academic learning, 87%, or 53 studies, found positive effects. Fourteen studies measured the impact of school gardens on attitudes toward gardening and all 14 found positive effects. Environmental attitudes were assessed in 15 studies and 73% found positive effects. Eighty-one percent of 16 studies on the effect of school gardens on nutrition found positive effects as did 92% of 12 studies on growing food. Two studies that measured the effects of school gardens on physical activity found positive results.

There are some limitations to this research synthesis, based on the limitations of the studies reviewed, specifically with respect to issues of sampling, validity, and possibly researcher bias. Nearly half the studies were conducted with third, fourth and fifth graders. This points to the need for research on the effect of school gardens in other grade levels. However, the results indicate strong support for the frequency of positive impacts across students' grades,

knowledge, attitudes and behavior. These positive impacts were, for nearly every outcome variable, including self-concept, motivation, life skills and environmental attitudes and included all the elementary, middle and high school levels, although the number of studies at high school level was the lowest. "These findings speak to the potential of garden programs in benefitting academic and academic-related outcomes" (Williams & Dixon, 2013, p. 225).

Example of School Garden Program: The Edible Schoolyard

The Edible Schoolyard program was founded in 1995 at Martin Luther King Jr. public middle school in Berkeley, California. Alice Waters, founder of Chez Panisse a restaurant in Berkeley that serves organically and locally grown food, started the program. The principal of the school read what she wrote in the newspaper about the abandoned and dilapidated lot adjacent to the school, and called her and asked for her help for what to do with it. Waters started a school garden and teaching kitchen that became tools for a public school curriculum that includes hands-on experiences in school gardens and kitchens that is linked to all academic subjects (Edible Schoolyard Project, 2017).

The school garden is a one-acre organic garden and kitchen classroom. As part of the Edible Schoolyard program, students participate in all aspects of growing, harvesting and preparing nutritious, seasonal produce. The vision is to use gardens and kitchens as interactive classrooms for all academic subjects, and also provide a healthy, sustainable, delicious, free lunch for every student (Edible Schoolyard Project, 2017). The Edible Schoolyard program is fully integrated into the school's curriculum. Teachers engage in hands-on learning, generating garden and kitchen lessons linked to classroom studies in science, math, etc. The curriculum is designed to reveal the links between the food we grow and eat, and agroecology, agronomy, anthropology, biology, business, economics, nutrition, philosophy, policy, sociology,

technology, and the arts (Edible Schoolyard Project, 2017). As such, the program is based on pragmatism and is similar in some respects to the program set up by Dewey at his Laboratory School at the University of Chicago almost a century earlier in that it is based on problem solving, connecting theory with practical experience, integrating classroom learning and the natural environment, and hands-on learning. The movement caught on and it continues to grow to this day. The program has inspired the growth of gardens in other schools throughout the country and the world and has become a model of edible education in national and international programs. Its website lists 5510 programs from 53 U.S. States and 64 countries around the world.

The Edible Schoolyard Network, through its website, connects educators around the world to build and share a k-12 edible education curriculum. Resources for garden, farm and kitchen based programs are listed for various subjects and grade levels. The Edible Schoolyard provides a 5-day training for educators all over the world at its academy in Berkeley. The model program at Berkeley is fully funded by the Edible Schoolyard Project, which also funds other Edible Schoolyard projects.

The Case for more High School Student Gardens

Fang (1995) argued that the use of school gardens as educational resources has been predominantly limited to primary schools, but that the skills gained through gardening are beneficial to high school students as well. Fang argued that high school gardens serve as a way to learn about the environment and to foster community: "The communal, environmental, and social discoveries made in growing a vegetable garden provide academic and personal challenges for high school students" (para. 5).

A possible obstacle to school gardens being used in high schools is that secondary school curricula are often more structured than those of primary schools. A highly-structured curriculum can mean less flexibility in lesson plans, which could pose difficulties for the teacher (Fang, 1995). Most of the curriculum development for school gardens is interdisciplinary and works well in grade schools where students are not in separate classes for math, science, English, etc.

Similarly, if one looks at the curriculum development for these programs (e.g., Edible Schoolyard Project, 2017), one sees that they are mostly at the grade school level. Although there are some curricula for using a school garden as a teaching tool at the high school level, there is still considerable need for further development. FoodSpan, from the Center for Livable Future at Johns Hopkins University, is a free, downloadable high school curriculum on food system issues designed to provide high school students with an understanding of food system issues, empower them to make healthy food choices, and encourage them to become advocates for food system change (FoodSpan, n.d.) Lessons are aligned with national education standards in science, social studies, health, and family and consumer sciences. FoodSpan lessons are paired with classroom readings and a film that showcases six projects from around the US that are increasing access to healthy food in varied and innovative ways (FoodSpan, n.d.). The Food Project is a nonprofit farm in eastern Massachusetts that works with 120 teenagers and thousands of volunteers each year to farm on 70 acres in eastern Massachusetts. It is not a typical K-12 school farm, or even a farm that hosts schoolchildren. The goal of The Food Project is youth development, not farm education (even though they pride themselves on teenagers learning to be fluent in food systems), through "increasingly responsible roles, with deeply meaningful work" (The Food Project, n.d.). The Food Project also serves as a resource center for organizations and

individuals worldwide. Specifically, The Food Project provides curricula for food systems education at the high school level (The Food Project, n.d.).

Challenges for School Gardens

The biggest challenge to school gardens is the argument that students shouldn't be taken out of the classroom where they are learning the core disciplines. A good example of this argument is Flanagan's (2010) attack on Alice Waters and the Edible Schoolyard. Flanagan argues that school gardens are cheating our most vulnerable students, and gives the example of a Mexican immigrant coming to the U.S. to work in the fields in order to attain a better life and his U.S. born child going to school in Berkley and having to work in a school garden. As stated by Flanagan:

> A cruel trick has been pulled on this benighted child by an agglomeration of foodies and educational reformers who are propelled by a vacuous if well-meaning ideology that is responsible for robbing an increasing number of American schoolchildren of hours they might otherwise have spent reading important books or learning higher math (attaining the cultural achievements… that have lifted uncounted generations of human beings out of the desperate daily scrabble to wrest sustenance from dirt) (para. 2).

Flanagan (2010) doesn't have a problem with these programs if they are after school, but thinks they rob students of valuable learning time during school: "until our kids have a decent chance at mastering the essential skills and knowledge that they will need to graduate from high school, we should devote every resource and every moment of their academic day to helping them realize that life-changing goal (para. 33).

Flanagan calls the student garden movement a fad and refers to "the Alice Waters fan club." Flanagan asks what evidence is there that participation in these programs, "improves a child's chances of doing well on the state tests that will determine his or her future (especially the all-important high-school exit exam) and passing Algebra I, which is becoming the make-or-break class for California high-school students?" (para. 15).

Flanagan wrote this in 2010 when there was already substantial evidence that school gardens are effective in teaching math and language skills. What is missing and would help the school farm movement is research on the effect of school gardens on standardized tests. However, the goal of K-12 education is not just to pass state tests, and there is clearly important learning and development going on in school gardens other than learning how to garden, as described in the studies reviewed above.

Hulkower (2010) responds to Flanagan's criticisms of Alice Waters and the Edible Schoolyard, and says that whether school gardens educate children, rather than just help them pass state tests, does not seem to merit consideration by Flanagan: "Presumably, [subjects] like art, music, and anything else that is not in the state performance exams, working and learning in the school garden is a sham activity that betrays the true needs of students, mostly minority, to prove their testing competence" (para. 1). Hulkower argues that Flanagan ignores educational theory and research on the effectiveness of school gardens. Hulkower also challenges Flanagan's attack on Alice Waters. According to Hulkower, the expansion of school gardens does not stem from some, "mesmeric, cult-of-personality influence of Alice Waters on school districts" (para. 3). Rather, Hulkower says it is because school gardens work: "School boards and principals have seen success stories and have chosen to incorporate school gardens into our schools" (para. 3). According to Hulkower, when Flanagan criticizes the involvement of Hispanic students in schools garden tasks like harvesting lettuce, she is actually condescending to the people she purports to defend . "Flanagan denigrates labor and laborers with her view that hard work is an activity that should be avoided, instead of an action that deserves our respect" (para. 4).

Like school farms, financial resources are also a challenge for school gardens. While school gardens do not require the degree of financial resources that student farms require, because they are typically much smaller in size and involve less infrastructure, there are still costs. The primary cost is having someone with the appropriate education run the school garden. Most teachers do not have sufficient knowledge and skills in farming/gardening to effectively run a school garden. Staffing consistency was viewed as a major barrier for most student gardens in one study of school garden stakeholders (Rogers, 2012). This was especially true for programs without permanent staffing and those that relied on student and volunteer staffing for program functions. Constant turnover and short lived staffing positions was often disruptive and inefficient within the structure of the garden program. In addition, staff changes year in and year out caused stagnation among long-term partnerships within the institution and with the community. Rogers' recommended solution was to build the financial support structure to hire a permanent employee dedicated to the program (Rogers, 2012).

Recommendations for Establishing a Successful Student Farm or School Garden

Several researchers have made recommendations for establishing a successful student farm. The most comprehensive list of recommendations is from Sayre and Clark (2011) who analyzed 15 successful college/university farms (see first half of paper for the list of colleges/universities) and provided a list of 12 key steps to establishing a successful student farm. Short studied the leadership and organizational structures of five successful student farms (defined as having been in existence for ten years or more), four in Canada and one in the U.S.: University of British Columbia, University of Calgary, University of Victoria, York University, and University of California Davis. The results of the study indicated that, if student farms are to be successful, they must have six attributes. Several were similar to Sayre and Clark (including

funding). Short also emphasized the importance of leadership structure and creating goals and objectives that overlap with university and community strategic plans. Finally, Rogers (2012) conducted a study on best practices in 46 student farms using quantitative data from online surveys with school garden stakeholders and qualitative data in the form of interviews with a subset of the larger sample. Rogers came up with a list of five recommendations for student farms. Again, most were similar to Sayre and Clark (including funding). But Rogers emphasized the importance of reliable staffing.

Rather than listing these three sets of recommendations separately, I have made an inclusive list of 15 recommendations synthesized from the above sources (albeit primarily from Sayre and Clark, 2011). I have added one recommendation of my own which is to plan for the appropriate level of student leadership. I believe that all these recommendations are equally relevant for K-12 school gardens. The recommendations are:

1. Form your core group: identify a core group of three to six people in your institution who are not just interested but willing to work to make this farm/garden happen.
2. Identify your partnership stakeholders and allies: who can help you in your institution (faculty members, deans, provosts, the president, alumni, student organizations, etc.) and your community to establish program stability and sustainability. Create goals and objectives that overlap with university and community strategic plans. Create linkages with academic and community organizations.
3. Hunt for land.
4. Do your homework: you need a mission statement, site plan, business plan, marketing plan, field plans, etc.
5. Plan your leadership structure: you will need a strong, collaborative, participatory, and flexible leadership structure. Plan for the appropriate level of student leadership.
6. Seek a stable source of funding, internal and external, including grants.
7. Program stability: seek a consistent source of long-term funding for a highly trained and permanent position, such as director or manager, who can handle the diverse responsibilities of a student farm and maintain the continuity of the program.
8. Start small. Keep your cropping plan simple, limiting crops and varieties to a manageable number. If things go well you can expand and diversify over time.

9. Keep it weeded. Not just for good yields but for aesthetic purposes; if you're trying to win over an entire campus community, it helps to keep things tidy.
10. Read. A key rationale for student farming is that book learning and hand-on learning are complementary. Assign readings as part of courses associated with student farm.
11. Write. Not just in early planning stages. Write what you've done and what you plan to do on regular basis, keep a record of what worked and what didn't and how much it costs. Good record keeping is essential if you plan on organic certification.
12. Think very carefully before adding livestock.
13. Cultivate partners and supporters internally and externally. Effectively and continually communicate with stakeholders. Demonstrate and communicate your success on campus and within your community.
14. Socialize. You will have easier time attracting and keeping workers if the farm is a place where people enjoy spending time. Hosting events where you invite others to the farm is a key to the life and continued survival of the farm.

Several things are clear from the above recommendations for establishing and maintaining successful student farms or school gardens. First, is the importance of planning including establishing the goals, mission statement, site plan, business plan, marketing plan, field plans, curriculum, leadership structure, along with almost every other aspect of the farm/garden operation and aligning the goals and mission statement of the farm/garden with the goals of the institution and community. Clearly, there needs to be an immense amount of planning and development done before implementation of the farm/garden can begin. Planning must be done thoughtfully and carefully to successfully achieve the goals that the school has for the farm.

Second, it is clear that funding must be established ahead of time and that there must be a consistent source of funding for the program to be maintained. Internal funding can be supplemented by CSA sales, grant funding, and such, but these income sources must be secondary to an internal and consistent source of funding. Similarly, it is clear that successful student farms and school gardens must have a staff member whose specific task is managing the farm/garden. Personally, I believe that this is one of the most critical components of success. The complexity of farming and managing a farm requires a horticulturally trained and educated

professional. Operating a student farm/school garden requires a knowledge of plant physiology, integrated pest management, soil science, crop planning, mechanical engineering, marketing, sales, instructional and curriculum development, etc. Managing a student farm/school garden is no simple task and requires constant attention. If the farm/garden is started by teachers/educators from other academic departments (biology, literature, etc.) their initial enthusiasm for the farm/garden may diminish in time because of the large time and effort and commitment it takes to manage a school farm/garden and to also teach their primary courses. This reduction in commitment will ultimately reduce the chances of a highly successful student farm/school garden.

Conclusion

From this literature review, it is clear just how successful the student farm and school garden movement has become. Undoubtedly, this is due to the educational benefits of student farms and school gardens. Student farms and school gardens exist at all grade levels, in all climates, and in many different types of schools. But each one is unique and specially designed for each institution. There is no cookie cutter model for student farms and school gardens. This requires each program to develop its own curriculum based on its unique situation. Fortunately, there are many models to draw on.

High schools appear to be the most underserved section of our country's educational system when it comes to school gardens. This is, as previously mentioned, most likely due to our educational system's almost sole focus on a standard, single discipline, based curriculum. This causes a major obstacle for implementing school gardens in public high schools. But private and alternative schools are more widely implementing school gardens at the high school

level. I believe that these schools will become positive examples of the wide benefits of high school level school gardens.

I hope that this review of literature will provide a solid background on the history and current status of the student farm and school garden movement. I hope that it will allow educators and others to gain a broad understanding of the diversity of student farms and school gardens, and an appreciation for the myriad ways farms and gardens can be incorporated into educational settings. Finally, I hope this review of literature will guide individuals interested in starting a student farm or school garden to successfully establish a student farm or school garden, as well as maintain the program into the future. This is crucial work, as student farms and school gardens are essential tools for establishing and maintaining a citizenry composed of informed and active participants in the food system, thus creating a food democracy.

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Footnotes

[1] University of Oregon, University of California Santa Cruz, Michigan State University, Purdue University, Cornell University, Pennsylvania State University, Rutgers University, Duke University, Texas A&M, and University of Georgia.

Part Two

Enterprise Budget - Raspberry Production for Food For Thought: Project Report

In summer of 2017 I had the opportunity to consult for Food For Thought, a small, private, for-profit business that has a certified organic food production facility in Honor, Michigan. The mission of Food For Thought is to create and raise awareness around just and sustainable food. Food For Thought makes value-added products, primarily preserves and salsas. It grows a couple of its own ingredients and purchases fair trade sugar and uses high quality ingredients that are responsibly grown and sourced - organic, non-GMO, fair trade. Food For Thought has a commitment to organic foods. It also has a commitment to family farms, partnering with local Michigan farmers. In addition, Food For Thought has a production facility that uses green and recycled materials.

Background of Project

Food for Thought asked me to develop a farm and land utilization plan that was in keeping with their company mission and the vision for their newly acquire Long Lake processing facility. The company had outgrown its current production facility. Tamarack Holdings, partial owner of Food For Thought, bought an abandoned school building and the surrounding 10.5 acres in Traverse County with the intent of turning the empty school into a production facility and, possibly, educational space for itself and future partners. Food for Thought was planning to grow food crops on the 10.5-acre parcel to increase

the amount of ingredients Food for Thought grows itself and uses in its products. The plan included building hoop houses and a storage building and the planting of crops to be used as ingredients in Food For Thought products.

My original task focused on creating recommendations for converting their newly acquired Long Lake property for fruit and vegetable crop production. In the spring of 2017, Food for Thought also asked me to develop an agricultural development plan for their business. Food For Thought, wanted the scope of this plan to focus on: (1) growing produce for their production facility and (2) sponsoring a large community-based agriculture program. Ideas for the community-based agriculture plan included creating a community garden space, a school garden with the neighboring Long Lake Elementary School, and a teaching or educational space for several local community college agriculture programs.

As the summer progressed and construction on the new processing facility began, I became aware of Food For Thought's decreased interest in the community based agriculture part of the project. Presently, there are no immediate plans for any such project. There still exists a possibility for establishing a relationship with the neighboring elementary school. However, after multiple meetings with the school principal and despite strong support for the idea, it seems that there is a lack of time and money to initiate such a program. Other proposed projects also never seemed to take hold after initial investigations and discussions. Perhaps, they will in the future, but presently Food For Thought is facing the very large task of transitioning their production facility to a new location and beginning the process of planting crops. Therefore, the initial desire to establish a community based agriculture program is on

hold. It is my sincere hope that this part of the original project will get off the ground in the near future.

Purpose and Scope of Project

By the end of the summer 2017 I had convinced Food for Thought to begin the first of a two-year cover-crop plan that would prepare 1.5 acres of land for future agricultural production. By this point in time, Food for Thought had decided it wanted to investigate the possibility of producing a significant amount of the raspberries to use in their products. I was asked to create an enterprise budget for an agricultural project that would annually produce roughly 4000 pounds of raspberries. The purpose of this budget was to document the project's required: (1) general management/operation practices; (2) resources/equipment needed and (3) estimate the profitability of the agricultural enterprise.

One of my initial reactions that I shared with Food For Thought was that, most likely, they would not be able to produce raspberries at a cost less than or equal to what they were presently paying. This was because the raspberries Food for Thought was purchasing were not Grade A but rather a lower grade and less expensive raspberry. On average, they were paying an average of $3 per pound for raspberries.

Food for Thought also said they were interested in the possibility of selling their berries locally through such a farm store or a farm stand (direct market) or grocery stores. Therefore, I produced budgets that included producing raspberries for five different market scenarios:

1. 100% of the berries processed for value-added products

2. 100% to be sold through direct sales
3. 100% to be sold to grocery stores
4. 50% for processing and 50% to grocery store sales
5. 33.33% going to each of processing, direct market sales, and grocery store sales.

I presented the results of the enterprise budgets to Food For Thought and I am presently waiting to hear back from them. All documents presented to Food For Thought are included in the Appendices. All documents were presented to Food For Thought in both pdf files and Excel formats. The following will describe each step used in preparing the enterprise budgets.

In order to prepare an enterprise budget for this project it was first necessary to:

1. Detail placement of production fields at the location chosen by the client.
2. Estimate the time and materials necessary to prepare the soil for agricultural production.
3. Estimate capital investment necessary prior to actual production

Production Field Location and Acreage Allocations

The plan recommended the designation of 3 production fields totaling 1.5 acres of production (see Appendix A for Proposed Field Map). The 1.5 acres would be allocated as follows:

1. 0.6 acres (215' x 125')
2. 0.3 acres (60' x 175')
3. 0.6 acres (non-square 185'x 95')

Soil and Site Preparation

The second step in preparing the enterprise budget involved estimating the procedures and materials necessary to prepare the existing soil for agricultural purposes. The plan includes my suggestions for tillage and cover cropping, initial rototilling, applying custom blend of fertilizer/soil amendments (based on results of prior soil samples), application of soil amendments, rototilling of custom blend into the soil, broadcasting or drilling cover crop seeds into soil, mowing and rototilling of cover crop back into soil, and taking additional soil samples. Appendix B details the management practices and material/equipment needed for soil preparation.

General Management Practices

The third step in preparing the enterprise budget was to detail suggestions relevant to estimating labor and material costs, crop yields, soil preparation, high tunnel construction, varietal selection and harvest/postharvest suggestions. These suggestions are meant to guide the implementation of the agricultural project.

Budget

Approximately 80% of the budget is dedicated to the construction of two 30'x 192' hoophouses. There are multiple benefits of producing raspberries in hoophouses. The primary benefit is that with the use of insect screening, full exclusion of Spotted Wing Drosophilia (SWD) can be achieved. A relatively new pest in Michigan that lays larvae in soft bodied fruit, it can often cause complete crop losses in organic systems as there is no other immediately available pest management strategies besides physical exclusion using netting. Additional benefits of producing raspberries in hoophouses include increased yields, increased berry size, significantly higher portion of grade A berries, and season extension.

Labor is estimated at $15 per hour. It is assumed that trained professionals are doing the labor. This is because production tasks, especially harvesting of berries, will take untrained workers significantly more time than trained professionals, more than would be compensated for by a lower hourly rate for untrained workers. It may be difficult to find trained professionals in our area, seasonal migrant laborers may be available during the primocane season and would be the best option for skilled labor.

Labor for a production manager is calculated at $20 per hour. I estimate that an operation of this scale would require a production manager for 10-15 hours a week during the growing season to plan and oversee the production.

Marketing costs and marketing labor are not included in the budget and need to be included in the final profit/loss margins for grocery store sales and direct market sales. Packaging costs are estimated for wholesale processing only. One-half pint containers and labels for retail processing would cost more than bulk harvest totes, but I do not believe it would be significantly more.

Yields are based on the best available evidence, an average of multiple Northern state extension services in ideal conditions. This is not a guarantee of what yields will be for Food For Thought. For the sake of precaution, a 1 year out of 10-year crop failure has been planned for in year 10. All labor for this year is included in budget other than harvest labor.

Process

Cover crop and amend the soil for a minimum of one year prior to planting, two years would be ideal. Eliminate all perennial weeds, especially quack grass, or future weed management will be a problem. Best organic methods for this cover cropping and repeated shallow tillage with spring tooth harrow every two weeks throughout summer.

Erect structures in very early spring or previous fall, prior to planting in late April/early May. It will be much easier to build structures before raspberries are planted. Till and amend soil before structures are built.

Order plants in December for best prices and varieties. Suggested suppliers included Indiana Berry Company and Norse Farms. I recommend primocane, or fall fruiting, varieties for simplicity of management. These varieties require a simple annual mowing of canes in late winter. Fruits form on the new one-year old canes in late summer/early fall. I recommend an assortment of primocane varieties for the first planting. Recommended varieties for our area include: Polana, Polka, Caroline, Autumn Britten, Joan J, Himbo Top, and Heritage. Spacing for berries is 7' between rows in the tunnel and 18" in row for planting.

Harvest/Postharvest

For harvest/postharvest activities remember that due to the extreme perishability of raspberries, it is standard practice to harvest berries directly into market containers. This would be ½ pint containers for direct market sales, or 1 bushel vented plastic containers for processing. Berries should be cooled immediately, within 4 hours, after harvest. One (1) bushel vented plastic containers need to be cleaned and sanitized between harvests.

To extend shelf life MAP (modified atmosphere packaging) can be used. This is a special formulated plastic bag that helps reduce fruit respiration. Harvest containers should never hold more than 4 layers of berries to prevent crushed fruit.

Capital Equipment

Necessary capital equipment prior to production includes: two 30' x 192' (roughly ¼ acre) four-season niftyhoops hightunnels. With automated roll up ventilation, roll up endwalls, and protek net insect netting on the sides. A Stihl extended pole hedge trimmer for cane trimming and

a Solo backpack 451 mist blower are highly recommended. It is also recommended that drip irrigation using pressure compensating Netafim Uniram drip tube be purchased and installed.

Estimating Pre-Operational Capital Costs

In order to estimate potential profit and losses from this agricultural enterprise it was necessary to establish the pre-production cost of:

1. Soil preparation
2. High Tunnel Construction
3. Additional Tools
4. Planting and initial Growing Costs
5. Trellis System

Soil preparation included doing soil samples, tilling the land, amending the soil, and cover cropping. The estimated cost was: $2,550.00.

High tunnel construction included steel tubing, fasteners, insect netting, poly cover and irrigation system. The estimated cost for two 30' x 192' fifty hoop houses was: $60,380.00.

Additional tools including a hedge trimmer and backpack sprayer was: $1,144.95.

The cost of the raspberry bushes, seed for grass/clover in alleys, including installation, weeding, monitoring plant growth/health was $9,187.68.

The trellis system for training the raspberries cost $2,416.00.

The total capital costs for pre-production was estimated to be: $75,678.63 (see Appendix C for details).

Estimating Yearly Operating Costs and Crop Yields

My financial analysis of this agricultural project included estimating ten-year production and harvest operating expenses and crop yields. The costs include: fertilizer, leaf analysis, pest management, pruning, hand weeding, and management, and harvesting. Year 1 production costs were estimated to be $9607.24. Harvest costs were estimated to be: $4050.00. Crop yields for processing sales were estimated to be 2738 pounds. Direct market or grocery stores sales were placed at 7400 half pints. Years 2 through 10 production costs were estimated at $9,607.24. Increased production in years 2 through 10 resulted in harvest cost going up slightly to $5,295.00. Yields also increased: Processing sales were estimated to be 3651 pounds with 9867 half pints estimated for direct market and grocery store sales. (see Appendices D and E for details).

Estimating Yearly Profit and Losses Across the Five Market Scenarios

The final analysis performed included creating Profit – Loss (P&L) statements for each of the five marketing scenarios. These P&L statements report yearly estimates of operating expenses, interest paid on capital investment loan (5%), estimated revenues and cumulative cash flows. The P&L statements also take into assumption that 100% of the harvested crop is sold. The five market scenarios were

(1) 100% of the berries going to processing for value-added products

(2) 100% to direct sales

(3) 100% to grocery store sales

(4) 50% to processing and 50% to grocery store sales

(5) 33.33% going to each of processing, direct market, and grocery store sales)

Summary of Profit Loss Analyses and Final Recommendations

Appendix G (Production for Processing Sales) reveals that growing the raspberries for their own value added products or another processor would yield an estimated ten-year negative cash flow of over $189,000 when taking into account all expenses (Start Up costs and operating expenses for years 1 – 10), capital loan interest expenses (5%), and yearly revenue. Thus, if Food For Thought grows raspberries for their own value-added product sales or another processor, they would have a net loss of $189,000 in ten years.

Appendix H (Direct Market sales) reveals that growing the raspberries and selling them through their own farm store or farm stand would result in an estimated ten-year positive cash flow of over $202,000.

Appendix I (Grocery Store sales) reveals that growing the raspberries and selling them to grocery stores would result in an estimated ten-year positive cash flow of over $28,000.

Appendix J reveals that if they sold 50% of crop yield to Processing and 50% to Grocery stores they would have an estimated ten-year negative cash flow of over $65,000.

Appendix K reveals that if they sold 33.3% of the crop yield to Processing, 33.3% to Direct Sales, and 33.3% to Grocery Store sales they would result in an estimated ten-year positive cash flow of over $30,000.

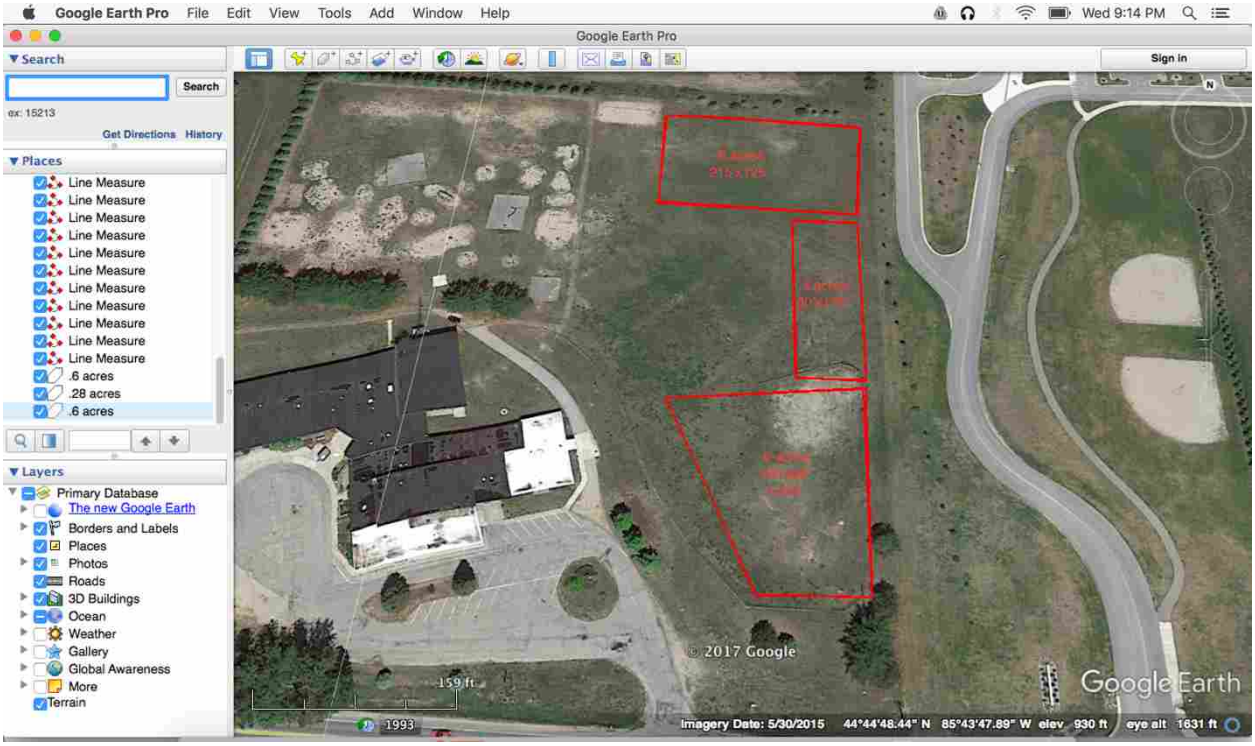
The results of this analysis clearly reveals that return on investment (ROI) would be highest if they sold the raspberries directly to consumers. The next highest ROI would be the marketing scenario of a 33.3% split across processing, direct sales and grocery store sales. What is also clear from these results is that if they use all the raspberries for processing in their own or another company's products or use the raspberries 50% for processing and 50% for grocery store

sales, this would not be justified from an investment perspective. Either way they would have a significant financial loss, significantly more so if they use all the raspberries for processing. This loss is due to several reasons. Primarily, because most berries sold to processing markets are grown in dryer arid climates where high tunnel production is not used nor would provide much benefit, therefore removing a significant capital investment. Along with the fact the mechanical harvesting is used for processing berries, decreasing the labor costs in a large factor. To my knowledge there are no mechanical raspberry harvesting operations in Michigan.

The final suggestion I made to Food For Thought, based on the results of these budgets, was that they should seriously consider the amount of time and energy it would take to carry out this project. Their expertise is focused on the production of value-added foodstuffs. Expanding into agricultural production would significantly add to their operations complexity and would require significant financial commitments for the necessary human resources and farming equipment and materials. Expanding into agricultural production for the purpose of using their own raspberries in their value-added products would be a financially losing proposition. Assuming they do not want to engage in a financially losing proposition, they need to ask themselves whether it make sense for them to grow raspberries for the purpose of selling them to grocery stores or directly to the public through a farm store/farm stand. They would have the repurposed Long Lake Elementary School building to house a farm store, but the question is still whether it makes sense for a company that presently produces value-added products to grow and sell raspberries directly to the public.

Appendix A: Production Field Locations and Acreage Allocation

- I am suggesting the designation of 3 production fields totaling 1.5 acres of production (see below for Proposed Field Map).
    1. 0.6 acres (215’ x 125’)
    2. 0.3 acres (60’ x 175’)
    3. 0.6 acres (non-square 185’x 95’)



Appendix B: Soil Preparation for Agricultural Production

- I am suggesting the tillage and cover cropping of a total of 2 acres which includes the 1.5 acres of production fields, drive paths, and small irregular acres that would be well-suited to small perennial plantings.
- The process that I recommend for putting this area into production is as follows:
    1. Rototill all two acres of land as soon as possible.
    2. Order custom blend of fertilizer/soil amendments as soon as possible.
        - Please see attached sheet for custom blend from Morgan's Composting.
        - This custom blend includes all macro and micro nutrients that showed deficiencies in the results of soil test sent to Bio-systems earlier this summer.
        - It also includes 2500# of dairy and poultry compost which will supply 100# of nitrogen per acre to help establish our cover crop along with organic matter which will greatly benefit our sandy soils.
        - This custom blend also includes 200# per acre of soil humates. Soil humates act as a nutrient holding reserve/additive. Humates have an extremely high level of CEC or Cation Exchange Capacity, which is basically a soils ability to hold onto nutrients. By adding humates to our soils we are immediately increasing our soil's ability to hold onto nutrients in plant available forms. Because our sandy soils have very low CEC levels we risk losing fertility and the nutrients we are applying to our soil through leaching. This amendment is something that I would recommend to any farm in our area and follow on my own farm.

3. Apply the custom blend on the two acres at the recommended rate of three tons per acre in mid-September. I would apply these amendments with a lime spreader rather than a manure spreader due to increased accuracy and the even spread that lime spreaders provide.
    - Lime spreaders can be rented from both Ellsworth Farmers Exchange in Atwood MI or CHS Agricultural Services in Traverse City MI.
        - I would highly recommend Ellsworth Farmers Exchange for this service. They are a farmers' cooperative and I have used their services and supplies for many years. They are open to using their spreaders with compost which most rental services are not.
        - The rental fee for a day or weekend should be $100
4. Rototill in the custom blend immediately after spreading.
5. After broadcast or drill 60lbs per acre of Rye and 35lbs per acre of hairy vetch and ideally culti-pack or drag harrow to increase the seed-to-soil contact immediately after.
    - You can purchase certified organic cover crop seed from Albert Lea Seed Company.
6. In Late May/Early June mow down cover crop with flail mower, bush hog mower will work but not as well.
7. Rototill in cover crop 1-2 weeks after mowing.
8. Broadcast buckwheat seed at a rate of 60-80 lbs per acre and culti-pack or drag harrow after.

9. Routinely mow buckwheat one week after it begins to flower to a height of six inches for three times unless weeds are too vigorous. Should be about every three weeks.
10. Take soil samples in early august and send to Biosystems to get an updated analysis of our soils.
11. In late August order, additional soil amendments as recommended in the updated soil test.
12. Spread soil amendments, till into soil, and seed areas that are not intended to be in production the following year into alfalfa/perennial grass mix. Seed areas intended to be in production the following year into oats/peas or rye/hairy vetch cover crop.

Appendix C: Capital Investments in Year 0
30' x192' Niftyhoop Tunnels (4 Rows per Tunnel)

PrePlant Costs	Input	Unit	Quantity	Cost Per Unit	Total Cost
Soil test	lab test	sample	1	$80.00	$80.00
Soil test	labor*	hour	0.5	$15.00	$7.50
Tillage, land prep	machine	total	1	$30.00	$30.00
Tillage, land prep	labor*	hour	4.5	$15.00	$67.50
Compost /fertilizer	materials	yard	18	$55.56	$1,000.00
Compost /fertilizer	labor*	hour	6	$15.00	$90.00
			Cost Per Tunnel		**$1,275.00**
Total for 2 Tunnels					**$2,550.00**

Tunnel Construction Costs	Input	Unit	Quantity	Cost Per Unit	Total Cost	Lifespan in Years	Annual Cost
30' x 192' niftyhoop	material	package	1	$27,330.00	$27,330.00	20	$1,366.50
Protek Net Insect Netting	material	roll	1	$1,080.00	$1,080.00	10	$108.00
Poly for years 5-10	material	roll	2	$640.00	$1,280.00	4	$320.00
Irrigation System	material	package	1	$500.00	$500.00	5	$100.00
			Cost Per Tunnel		**$30,190.00**		**$1,894.50**
Total for 2 Tunnels					**$60,380.00**		

Additional Tools and Supplies	Input	Unit	Quantity	Cost Per Unit	Total Cost	Lifespan in Years	Annual Cost
Stihl HL 94 hedge trimmer	tool	item	1	$499.95	$499.95	10	$50.00
Solo 451 backpack mist blower	tool	item	1	$645.00	$645.00	10	$64.50
				Total	**$1,144.95**		**$114.50**

Planting and Growing Costs	Input	Unit	Quantity	Cost Per Unit	Total Cost	Lifespan in Years	Annual Cost
Plant	bare root	plant	490	$0.92	$448.84	10	$44.88
Install Plants	labor	hour	10	$15.00	$150.00	10	$15.00
Straw Mulch	mulch	bale	10	$3.00	$30.00	10	$3.00
Install Straw Mulch	labor	hour	4	$15.00	$60.00	10	$6.00
Hand Hoe and Weed	labor	hour	12	$15.00	$180.00		$180.00
Monitor and Vent	labor	hour	15	$15.00	$225.00		$225.00
Organic Certification	certification	item	1	$1,000.00	$1,000.00		
Manager	labor	hours	300	$20.00	$6,000.00		
			Cost Per Tunnel		**$1,093.84**		**$473.88**
Total for 2 Tunnels					**$9,187.68**		**$947.77**

Trellis System	Input	Unit	Quantity	Cost per Unit	Total Cost	Lifespan in Years	Annual Cost
Metal Posts 8'	material	each	56	$7.50	$420.00	10	$42.00
Lumber 2" x 4" x 8'	material	each	40	$5.60	$224.00	5	$44.80
Hardware	material	package	1	$50.00	$50.00	10	$5.00
Wire Vise	material	each	64	$2.25	$144.00	10	$14.40
High Tensile Wire	material	per 1000'	3.5	$20.00	$70.00	10	$7.00
Installation	labor	hour	20	$15.00	$300.00	10	$30.00
			Cost Per Tunnel		**$1,208.00**		$143.20
Total for 2 Tunnels					**$2,416.00**		**$286.40**

Summary of Initial Capital Investment

2 - 30' x 192' Niftyhoop Tunnels

	Cost	Expected Lifespan in Years
Preplanting Costs	$2,550.00	10
Tunnel Construction Costs	$60,380.00	20
Tools	$1,144.95	10
Planting and Growing	$9,187.68	10
Trellis	$2,416.00	10
Total Cost for 2 Tunnels	**$75,678.63**	

Appendix D: Year 1 Estimated Production & Harvest Operating Expenses and Estimated Crop Yields

For Two 30' x 192' Tunnels

Production	Input	Unit	Quantity	Cost Per Unit	Total Expense
Fertilizer	compost and amendments	yards	7	$60.00	$420.00
Install Fertilizer	labor	hours	5	$15.00	$75.00
Leaf Analysis	test	sample	2	$75.00	$150.00
Integrated Pest Management	sticky cards	each	96	$0.44	$42.24
Scouting	labor	hours	18	$15.00	$270.00
Pest Management	pesticides	unit	1	$150.00	$150.00
Pest Management	labor	hours	12	$15.00	$180.00
Prune	labor	hours	24	$15.00	$360.00
Train Canes/trellis	labor	hours	16	$15.00	$240.00
Narrow Rows	labor	hours	8	$15.00	$120.00
Hand Weed	labor	hours	16	$15.00	$240.00
Monitor & Vent	labor	hours	24	$15.00	$360.00
Organic Certification	certification	item	1	$1,000.00	$1,000.00
Manager	labor	hours	300	$20.00	$6,000.00
Total Production Expense					**$9,607.24**

Harvest	Input	Unit	Quantity	Cost Per Unit	Total Expense
Harvest Container	item	1	20	$15.00	$300.00
Labor*	labor	hours	250	$15.00	$3,750.00
	Total Harvest Expense				**$4,050.00**

Total Production and Harvest Expenses	**$13,657.24**

Estimated Crop Yields for Each Scenario				
Scenario	**Unit**	**Unit Price**	**Quantity**	**Sales Income**
Processing Sales	pounds	$3.00	2738	$8,214.00
Direct Market Sales	half pint	$4.50	7400	$33,300.00
Grocery Sales	half pint	$3.00	7400	$22,200.00

Appendix E: Years 2 to 10 Estimated Production & Harvest Operating Costs and Estimated Yields

For 2- 30' x 192' Tunnels

Production	Input	Unit	Quantity	Cost Per Unit	Total Expense
Fertilizer	compost and amendments	yards	7	$60.00	$420.00
Install Fertilizer	labor	hours	5	$15.00	$75.00
Leaf Analysis	test	sample	2	$75.00	$150.00
Integrated Pest Management	sticky cards	each	96	$0.44	$42.24
Scouting	labor	hours	18	$15.00	$270.00
Pest Management	pesticides	unit	1	$150.00	$150.00
Pest Management	labor	hours	12	$15.00	$180.00
Prune	labor	hours	24	$15.00	$360.00
Train Canes/Trellis	labor	hours	16	$15.00	$240.00
Narrow Rows	labor	hours	8	$15.00	$120.00
Hand Weed	labor	hours	16	$15.00	$240.00
Monitor & Vent	labor	hours	24	$15.00	$360.00
Organic Certification	certification	item	1	$1,000.00	$1,000.00
Manager	labor	hours	300	$20.00	$6,000.00
	Total Production Expense				**$9,607.24**

Harvest	Input	Unit	Quantity	Cost Per Unit	Total Expense
Harvest Container	item	1	25	$12.00	$300.00
Labor*	labor	hour	333	$15.00	$4,995.00
	Total Harvesting Expense				**$5,295.00**

Total Production and Harvest Expenses	**$14,902.24**

Estimated Crop Yields				
Scenario	**Unit**	**Quantity**	**Price**	**Sales Income**
Processing Sales	pounds	3651	$3.00	$10,953.00
Direct Market Sales	half pint	9867	$4.50	$49,335.00
Grocery Sales	half pint	9867	$3.00	$29,601.00

Appendix F: Profit - Loss Estimates

Processing Sales Scenario

Year	Operating Expenses	Capital Loan Interest Expense @ 5%	Revenue	Cumulative Cash Flow
0	$75,678.63	$(3,248.68)	0	$(78,927.31)
1	$13,657.24	$(4,218.53)	$8,214.00	$(88,589.08)
2	$14,902.24	$(4,626.92)	$10,953.00	$(97,165.24)
3	$14,902.24	$(5,055.72)	$10,953.00	$(106,170.20)
4	$14,902.24	$(5,505.97)	$10,953.00	$(115,625.41)
5	$14,902.24	$(5,978.73)	$10,953.00	$(125,553.39)
6	$14,902.24	$(6,475.13)	$10,953.00	$(135,977.76)
7	$14,902.24	$(6,996.35)	$10,953.00	$(146,923.35)
8	$14,902.24	$(7,543.63)	$10,953.00	$(158,416.22)
9	$14,902.24	$(8,118.27)	$10,953.00	$(170,483.73)
10	$9,607.24	$(9,004.55)	$-	$(189,095.52)

Appendix G: Profit - Loss Estimates

Direct Market Sales Scenario

Year	Operating Expenses	Capital Loan Interest Expense @ 5%	Revenue	Cumulative Cash Flow
0	$75,678.63	$(3,248.68)	0	$(78,927.31)
1	$13,657.24	$(2,964.23)	$33,300.00	$(62,248.78)
2	$14,902.24	$(1,390.80)	$49,335.00	$(29,206.82)
3	$14,902.24		$49,335.00	$5,225.94
4	$14,902.24		$49,335.00	$39,658.70
5	$14,902.24		$49,335.00	$74,091.46
6	$14,902.24		$49,335.00	$108,524.22
7	$14,902.24		$49,335.00	$142,956.98
8	$14,902.24		$49,335.00	$177,389.74
9	$14,902.24		$49,335.00	$211,822.50
10	$9,607.24		$-	$202,215.26

Appendix H: Profit - Loss Estimates

Grocery Sales Scenario

Year	Operating Expenses	Capital Loan Interest Expense @ 5%	Revenue	Cumulative Cash Flow
0	$75,678.63	$(3,248.68)	0	$(78,927.31)
1	$13,657.24	$(3,519.23)	$22,200.00	$(73,903.78)
2	$14,902.24	$(2,960.25)	$29,601.00	$(62,165.27)
3	$14,902.24	$(2,373.33)	$29,601.00	$(49,839.84)
4	$14,902.24		$29,601.00	$(35,141.08)
5	$14,902.24		$29,601.00	$(20,442.32)
6	$14,902.24		$29,601.00	$(5,743.56)
7	$14,902.24		$29,601.00	$8,955.20
8	$14,902.24		$29,601.00	$23,653.96
9	$14,902.24		$29,601.00	$38,352.72
10	$9,607.24		$-	$28,745.48

Appendix I: Profit - Loss Estimates

50% Processing & 50% Grocery Sales Scenario

Year	Operating Expenses	Capital Loan Interest Expense @ 5%	Revenue	Cumulative Cash Flow
0	$75,678.63	$(3,198.00)	0	$(78,876.63)
1	$13,657.24	$(3,866.34)	$15,207.00	$(81,193.21)
2	$14,902.24	$(3,790.92)	$20,277.00	$(79,609.38)
3	$14,902.24	$(3,711.73)	$20,277.00	$(77,946.35)
4	$14,902.24	$(3,628.58)	$20,277.00	$(76,200.17)
5	$14,902.24	$(3,541.27)	$20,277.00	$(74,366.68)
6	$14,902.24	$(3,449.60)	$20,277.00	$(72,441.51)
7	$14,902.24		$20,277.00	$(67,066.75)
8	$14,902.24		$20,277.00	$(61,691.99)
9	$14,902.24		$20,277.00	$(56,317.23)
10	$9,607.24		$-	$(65,924.47)

Appendix J: Profit - Loss Estimates

33.3% Processing, 33.3% Direct and 33.3% Grocery Sales Scenario

Year	Operating Expenses	Capital Loan Interest Expense @ 5%	Revenue	Cumulative Cash Flow
0	$75,678.63	$(3,198.00)	0	$(78,876.63)
1	$13,657.24	$(3,564.79)	$21,238.00	$(74,860.66)
2	$14,902.24	$(2,990.00)	$29,963.00	$(62,789.90)
3	$14,902.24	$(2,386.46)	$29,963.00	$(50,115.60)
4	$14,902.24		$29,963.00	$(35,054.84)
5	$14,902.24		$29,963.00	$(19,994.08)
6	$14,902.24		$29,963.00	$(4,933.32)
7	$14,902.24		$29,963.00	$10,127.44
8	$14,902.24		$29,963.00	$25,188.20
9	$14,902.24		$29,963.00	$40,248.96
10	$9,607.24		$-	$30,641.72

Part Three

Farm Business Plan

For

Lakeview Hills Farm, LLC
Traverse City, MI
2018 Update

Farm Business Plan

Lakeview Hills Organic Farm

Executive Summary

The business plan for Lakeview Hills Organic Farm contains a description of the farm, its operating goals, management and marketing strategies, and a risk management assessment. It also contains financial data for the 2018 growing year.

Keys to Success

Lakeview Hills Organic Farm has identified key strategies that will be significant to it's success. The first strategy is the implementation of lean production and strict financial controls. By limiting the farm to crops that have high demand and high value, the farm will be able to maximize production and financial efficiency. The second strategy is to support the local community by providing local, organic vegetables and to help ensure that all members of the community have access to healthier food choices. The third strategy is keeping community members informed on all aspects of the farm, effectively communicating its activities through newsletters, social media, email lists, and new and exciting offerings. Additionally, the farm will solicit and review feedback and input from the community, recognizing that customer satisfaction is essential for a profitable and sustainable business.

Lakeview Hills Organic Farm is an LLC owned and operated by John Dindia and Bailey Samp that will supply local markets, processors, and restaurants with certified organic small fruit and vegetable crops. The farm will supply the demonstrated demand for locally grown produce and specialty fruits for value-added products, such as: juice, shrubs, and kombucha.

Mission

To create a more resilient community food system for Northwestern Michigan through lean production and marketing of certified organic small fruit and produce that is socially, environmentally, and economically sustainable.

Vision

Lakeview Hills Organic Farm envisions Northwestern Michigan as a community food system that is grounded in triple bottom line ethics (social, environmental, economic), and supports all members of its community.

Achieved Goals for 2017*

- Construct infrastructure including housing, barn, greenhouse posts, well, and driveway
- Install wood burning boiler heating system
- Install PV solar power system
- Establish cover crops on all 10 acres of tillable land
- Develop cover crop management and crop production plan
- Obtain organic certification
- Propagate 750 aronia plants
- Begin developing markets for produce, aronia, and elderberry

*(the property was acquired in mid-summer 2017, the first year is defined as the remainder of 2017)

Goals for 2018

- Complete all infrastructure projects left unfinished in 2017
- Construct Greenhouse, hoophouse, and workshop

- Obtain organic certification
- Install fencing around 4 acres for vegetables
- Install Irrigation around vegetables
- Grow ½ acre of vegetables, greenhouse tomatoes, and hoophouse crops
- Propagate 750 aronia plants
- Propagate 750 elderberry plants
- Successfully gross $76,000 through anticipated markets
- Plant 1 acre of aronia and 1 acre of elderberry in fall

Management Plan

John has co-owned and operated a small diversified vegetable farm for the past three years and has the skills and knowledge to successfully start and operate the farm. John attended Michigan State University and obtained a Bachelor's Degree in Sustainable and Organic Horticulture, while working on the MSU Student Organic Farm and the Bailey Urban Farm. Currently, John is attending graduate school at the University of Montana working towards a Masters in Environmental Studies with a focus in Sustainable Food and Farming and a concentration in Community Agriculture.

Bailey has worked in hospitality and event management and has a Bachelor's degree in Business Administration. Bailey's business knowledge and background will allow her to be responsible for the business operations for the farm. She is currently completing an event coordinator internship at a local marketing agency and nonprofit, Taste the Local Difference, where she is gaining useful knowledge and skills on how to market the farm and gain access to several different markets. Bailey will successfully contribute to operations of the business, be

responsible for developing clients, communicating the mission and vision within the local community, and helping the farm enter the agritourism market in the long term.

John and Bailey will manage and operate the business as a team. John's primary responsibilities will revolve around horticultural production and Bailey's on the business management and marketing of the farm. Bailey will maintain a part-time, off farm job year round, and John will work off-farm, part-time during the winter months. The farm will initially be managed solely by John and Bailey, at least through 2018, if the farm were to expand beyond the capability of John and Bailey one or two summer internships provided through the MSU Horticulture and Ag Tech program along with one year-round part time employee would be hired.

Land Management Plan

Lakeview Hills Organic Farm will be a certified organic farm grounded in the ethics of triple bottom line business management. We will maintain high levels of environmental and ecological management by prioritizing healthy ecosystems in and around our farm, and putting a focus on soil health. The farm will make it a priority to work towards a zero carbon footprint by utilizing solar PV systems to generate all of the electricity that the farm and homestead uses, and by using a wood boiler with wood collected from the property as our main heat source for all infrastructure. Additionally, a commitment will be made to never use single use disposable agricultural plastic products in our business.

SWOT Analysis

Strengths:

- Team members' experience, strengths and weaknesses balance well
- Extensive experience in direct marketing local produce

- Focus on high value, high demand products
- Large demand for local food products
- Utilization of hoops for health program to market to schools
- No current competition locally for many of the products we focus on
- Bailey has developed a strong network in the Traverse City area
- Centrally located between several markets

Weaknesses:

- John does not have much direct marketing experience in Traverse City
- Many established local farms create competition
- Farming is labor intensive
- Starting on vacant property requires many capital improvements
- Aronia and elderberry production will not see a return for at least 3 years

Opportunities:

- Currently, there are no local greenhouse tomato, hoophouse strawberries, aronia, and elderberry producers
- Agritourism is becoming more and more popular in the area
- Year round, restaurant and wholesale markets are larger than for John's previous farm, Spirit of Walloon Market Garden.

Threats:

- High loan payments
- Competition for similar products
- Aronia and elderberry are new products that need market development

Risk Management Assessment

Lakeview Hills Organic Farm will encounter several risks. The first risk is crop loss due to pest/weather damage. Lakeview Hill Organic Farm will manage this risk by:

1. Maintaining a diversified farm operation, therefore even if a specific crop loss or damage occurs, the economic impact will be balanced by other income sources.
2. Maintaining strict IPM control measures to mitigate and economically manage pest and disease problems.
3. Utilizing a whole farm irrigation system. This will eliminate the risk of drought occurring on the farm by having the whole farm under irrigation at all times.
4. For the perennial aronia and elderberry crops, frost is a potential risk in the spring that could cause complete crop loss, although it is much less likely than for many other perennial fruit crops. To manage this risk, by the fourth year of production for these crops, which will be the beginning of a large production value for the crop, the farm will enroll in the Whole Farm Revenue Protection Program, a new crop insurance program for diversified small farms provided by the USDA, to insure against crop loss.

Production and Products

Lakeview Hills Organic Farm will have 2 acres of vegetables with a limited and managed diversity of crops including (in order of economic value): greenhouse tomatoes, hoophouse tomatoes, salad mix, potatoes, hoophouse strawberries, microgreens, carrots, beets, scallions, hoophouse cucumbers, spinach, arugula, radish, hoophouse peppers, hoophouse eggplant, head lettuce, clamshell herbs, turnips, ginger, parsley, basil, and kale.

It is anticipated that over time the diversity of vegetables produced on the farm will decrease as we grow for specialized markets and and increase our efficiency. All of these products will be sold direct to market through the Traverse City and Suttons Bay farmers markets, local farm to table restaurants, and local grocery stores and food cooperatives.

The highest value crop on the farm, bringing in approximately 18% of our $76,000 gross sales from vegetable crops, will be greenhouse tomatoes grown in soil. These will be produced in a 34' x 60' greenhouse area and will be in production/harvesting from May to November. All of the tomatoes will be sold directly through farmers' markets to achieve the highest value per pound. There is excellent market potential for organic greenhouse heirloom tomatoes because production and marketing will begin mid May, at least 2 months before any other competitor will have tomatoes available at market. Because our greenhouse will be heated with a high efficiency wood boiler, the cost of production will be much lower compared to those being heated with LP gas, keeping our profitability high. Not only will we have a significant market advantage by beating other competitors to market, but organic greenhouse tomatoes will have a market value of $5/lb. until other competitors have their tomatoes to market in mid-July at which time market value will lower to $3/lb.

Lakeview Hills Organic Farm will utilize moveable hoophouses on the farm. John has three years of experience operating moveable hoophouses and understands their economic advantages compared to stationary hoophouses. The farm's first 34' x 96' moveable hoophouse will be constructed in the spring of 2018. This will allow for a $9,750 hoophouse tomato crop, $2,750 cucumber crop, $2,000 pepper crop, and $2,000 eggplant crop. The hoophouse will be moved over strawberries and spinach planted that fall. The spinach in the hoophouse will produce a $2000 crop through February when it will be removed and seeded in carrots. Come

the following spring, the house will produce a $7500 strawberry crop beginning early May that will be sold through farmer's markets at $8 per pint. This is $4 over the average organic local pint price of strawberries that occurs when they are in season in mid-June. The hoophouse will also produce a $2,000 carrot crop that can be sold at $5 a bunch beginning mid-May, which is $1 - $2 over the average seasonal price for local organic carrots which begins mid-June. The hoophouse can then be moved again for a repeated summer crop of tomatoes, cucumbers, peppers, and eggplant.

The farm will continuously manage 2 acres of vegetable cropland in cover crops that will be rotated on an annual basis.

Additionally, the farm will produce 2 acres of elderberry (1 acre planted in fall of 2018 and the 2nd acre in fall of 2019) and 1 acre of aronia planted in the fall of 2018. It is anticipated that the farm will produce additional aronia and elderberry for a total of 6 acres, but this will not be done until after a few years of steadily developed markets for both crops. Both crops will be sold through direct and wholesale outlets. Approximately 1/3 of the crop will be sold through farmers' markets and restaurants, and the remaining 2/3 will be sold through processors and local distributors.

Aronia will be mechanically harvested with a rented blueberry harvester from local blueberry growers. It will be affordable and easily available because Aronia is harvested in late September, over a month later than the last blueberry harvest.

Elderberry will be harvested by hand due to the fragility of the berries.

Description of Markets

Lakeview Hills Organic Farm will distribute approximately half of their products (other than aronia and elderberry) through the local Suttons Bay Farmers Market and Sara Hardy Traverse City Farmers Market from May through November. These markets are well established

and draw large numbers of customers during peak season. The remaining half of the crop will be sold directly to local farm-to-table restaurants such as: The Cook's House, Alliance, Mission Table, The Boathouse, Taproot Cider House, Rare Bird Brew Pub, and local food trucks. In addition to farm-to-table restaurants, we will sell to the wholesale market including: Oryana Food Cooperative, Tom's Grocery Store, and other health food stores. Bailey's experience and close relationships within the local hospitality industry will provide access to these markets. Approximately 1/3 of the aronia and elderberry will be marketed through the markets stated above. The remainder will be distributed fresh-frozen year-round through many processors and distributors in Grand Traverse County that focus on utilizing local ingredients. These include: American Spoon, Food for Thought, The Shrub Soda Company, Cherry Capitol Distribution, Cultured, and a diverse array of breweries, wineries, and cider houses.

Marketing Plan

The purpose of Lakeview Hills Organic Farm is to provide locally grown, certified organic produce and specialty berries to local consumers. Our goal is to increase efficiency and productivity each year to provide our markets with quantities sufficient to maintain our financial sustainability. We will have a strict commitment to the triple bottom line of maintaining and balancing environmental, social, and economic priorities. Products will not only be marketed as certified organic, but they will be marketed as "beyond" organic, emphasizing our commitment to minimizing our carbon footprint by solely utilizing solar energy for electricity consumption and clean and efficient wood burning as our heat source. This allows Lakeview Hill Organic Farm to environmentally surpass other farmers in the local area, likely drawing in a higher market demand.

The marketing strategy for aronia and elderberry will be similar to that above, additionally focusing on the specialty aspects of the two berries. This includes their record high levels of antioxidants, each being considered a "superfood," along with a unique ability to bring an attractive tartness and dark purple coloring to processed goods. Additionally, the berries are easily flash-frozen fresh and store for months while maintaining excellent quality. Therefore, aronia and elderberry are both ideal stable market items.

Benefits to be Marketed

Lakeview Hills Organic Farm will provide to local markets the following:

- An extended availability of new and local organic produce items
- An opportunity to keep money within our local economy
- Food to local restaurants and grocery stores therefore promoting local food
- Increased diversity at farmers' markets, restaurants, and processors
- High antioxidant levels in berries promoting health and well-being

Target Customers

- Grand Traverse and Leelanau County shoppers at health food stores
- Local chefs
- School districts and institutions
- Families caring of their children's health and well being
- Tourist and seasonal consumers looking for healthy convenience food at farmers' markets
- Local food consumers
- Local companies with value-added products

Positioning

Lakeview Hills Organic Farm will be one of a few farms growing organic produce locally. What will separate this farm is that it will supply greenhouse tomatoes and hoophouse strawberries for the first time in the local market. We will also open a new market for specialty fruits, elderberry and aronia, supplying a new product to local processing companies focused on beverages and fresh frozen fruits to the wholesale market.

Lakeview Hills Organic Farm will be competing with local growers in produce, but we will emphasize organically grown value and utilizing environmentally friendly solar energy for electricity consumption and quality fresh produce.

Pricing

Pricing for Lakeview Hills Organic Farm is based on previous records of Spirit of Walloon Market Garden pricing for crops sold in 2016.

Crop	**Retail Price**	**Wholesale Price**
Kale	$2/bunch	$3/pound
Basil	$2/bunch	$14/pound
Parsley	$2/bunch	$12/pound
Ginger/Turmeric	$20/pound	$15 / pound
Hakurei Turnip	$3/ bunch	$3/pound
Clamshell Herbs	$30/ pound	$24/lb.
Head Lettuce	$3/ head	$2/head
Eggplant	$3 / ea.	$4/pound
Peppers	$2 / ea.	$3.85/pound
Radish	$2 / bunch	$2/pound
Arugula	$4 / 1/3 pound	$8/pound
Spinach	$4 / 1/3 pound	$8/pound
Cucumber	$1 / each	$3/pound
Shallots	$3 / two	$4/pound
Beets	$3 / bunch	$2.5/pound
Carrots	$4 / bunch	$3/pound
Microgreens (trays & #)	$ 5 / 1/8 pound	$15 / pound

hoophouse Strawberries	$8 / pint	
Potatoes	$ 5/ pt. $8/ quart	$3.5/pound
Salad mix	$4 / 1/3 pound	$8/pound
Tomatoes, greenhouse regular season	$3.75/ lb.	$3/pound
Tomatoes, Greenhouse early season	$7 / lb.	$5/pound

A spreadsheet below details the crops Lakeview Hills Organic Farm will produce along with the area each crop will be in production. The yield (in dollars) per square foot is based on Spirit of Walloon's 2016 records of total individual crop sales and total area in production.

Projected 2018 Lakeview Hills Organic Farm Crop Sales **based on 2016 Spirit of Walloon crop sales**			
Crop	Total sq. ft.	$ / sq. ft.	Total sales
Kale	250	$1.28	$320.00
Basil	500	$1.45	$725.00
Parsley	250	$3.08	$770.00
Ginger/Turmeric	300	$6.00	$1,800.00
Hakurei Turnip	1000	$1.40	$1,400.00
Clamshell Herbs (# of clams, $ per clam)	500	$3.00	$1,500.00
Head Lettuce	2750	$1.74	$1,580.46
Eggplant, Hoophouse	480	$3.93	$1,886.40
Pepper, Hoophouse	480	$4.20	$2,016.00
Radish	2000	$1.10	$2,200.00
Arugula	1662	$1.38	$2,293.56
Spinach	1662	$1.38	$2,293.56
Cucumber, Hoophouse	750	$3.60	$2,700.00
Beets	2375	$1.27	$3,016.25
Carrots	3000	$1.48	$4,440.00
Microgreens (trays & #)	275	$18.00	$4,950.00
Potatoes	7200	$1.10	$7920.00
Salad mix	7500	$0.97	$7,275.00
Tomatoes, Greenhouse	3264	$7.00	$22,848.00
Winter Squash	6000	$0.90	$5400.00
			$77,294.00

Pricing for Aronia: $5/pound

Pricing for Elderberry: $4.50/pound

Long Term Goals

Lakeview Hills Organic Farm plans on taking full advantage of Bailey's experience as an event manager, along with the potential profitability from agritourism, to develop a plan for seasonal events such as: harvest dinners, community pot-lucks, weddings, educational tours, workshops, and farm stay getaways. This alternative use of the farm will increase income and build strong supportive relationships with the community and general public. Increased public interaction will build a deeper understanding and appreciation for working landscapes and enhance our mission to create a more resilient community food system.

Budgets

Cash Flow Statement Year 1

Fiscal year begins: 1/1/18	(Pre) Startup EST	JAN 01	FEB 01	MAR 01	APR 01	MAY 01	JUN 01	JUL 01	AUG 01	SEP 01	OCT 01	NOV 01	DEC 01	Total Item EST
Cash Receipts														
Farmers Markets						3823	4100	7646	9558	7646	2730	2730		38233
Wholesale						3186	4779	6372	6372	6372	4779	3186	3186	38232
Total	0	0	0	0	0	7009	8879	14018	15930	14018	7509	5916	3186	76465
Cash Paid Out														
Fertilizer													2561	2561
Compost											1500			1500
Pest Management													300	300
Car and Truck		100	100	100	100	200	200	200	200	200	200	200	200	2000
Fuel on Farm					30	30	30	30	30	30	30			210
Repairs & maintenance					100						100			200
Loan interest													1693	1693
Seeds & plants		2500											2000	4500
Supplies						100								100
Advertising					200								25	225
Fees		500												500
Phone and internet		100	100	100	100	100	100	100	100	100	100	100	100	1200
Books and Education			400											400
Insurance		900												900
Taxes (real estate, etc.)													3000	3000
Farmers Market Equipment					100									100
Harvest, wash, pack		175								175				350
Office Supplies		100												100
Plant Propogation			500	500	500								200	1700
Small Tools				175		175							400	750
Miscellaneous													200	200
Total	0	4375	1100	875	1130	605	330	330	330	505	1930	300	10679	22489
Cash Paid Out (Non P&L)														
Loan principal payment													6218	6218
Capital Improvements													7500	7500
Owners' withdrawal													40258	40258
Total	0	0	0	0	0	0	0	0	0	0	0	0	53976	53976
Total Cash Paid Out	0	4375	1100	875	1130	605	330	330	330	505	1930	300	64655	76465

Aronia Berries Production Cost per Two Acres

1) REVENUE

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
A) Revenue										
Harvest Yield (lbs)	-	-	12,325	18,488	24,650	24,650	24,650	24,650	24,650	24,650
Retail (lbs)	-	-	6,163	9,244	12,325	12,325	12,325	12,325	12,325	12,325
Market price ($)	$ 1.0	$ 1.0	$ 1.0	$ 1.0	$ 1.0	$ 1.0	$ 1.0	$ 1.0	$ 1.0	$ 1.0
Revenue retail ($)	$ -	$ -	$ 6,163	$ 9,244	$ 12,325	$ 12,325	$ 12,325	$ 12,325	$ 12,325	$ 12,325
Wholesale	-	-	6,163	9,244	12,325	12,325	12,325	12,325	12,325	12,325
Market price ($)	$ 0.5	$ 0.5	$ 0.5	$ 0.5	$ 0.5	$ 0.5	$ 0.5	$ 0.5	$ 0.5	$ 0.5
Revenue wholesale ($)	$ -	$ -	$ 3,081	$ 4,622	$ 6,163	$ 6,163	$ 6,163	$ 6,163	$ 6,163	$ 6,163
Total revenue ($)	$ -	$ -	$ 9,244	$ 13,866	$ 18,488	$ 18,488	$ 18,488	$ 18,488	$ 18,488	$ 18,488

2)COST

A) Fixed Cost

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
A) Harvesting										
Harvestor depriciation	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Harvestor maintenance	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Harvestor interest	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Harvestor insurance	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Harvestor Rent			$ 3,000.00	$ 3,000.00	$ 3,000.00	$ 3,000.00	$ 3,000.00	$ 3,000.00	$ 3,000.00	$ 3,000.00
B) Planting										
Viking liners	$ 2,030	-	-	-	-	-	-	-	-	-
Fertility testing/acre	$ 75	$ 75	$ 75	$ 75	$ 75	$ 75	$ 75	$ 75	$ 75	$ 75
Fertilization/acre	$ 210	$ 18	$ 150	$ 150	$ 150	$ 150	$ 150	$ 150	$ 150	$ 150
Seeding b/t row/acre	$ 500	-	-	-	-	-	-	-	-	-
Plastic mulch	$ 436	-	-	-	-	-	-	-	-	-
Irrigation Cost	$ 2,000	-	-	-	-	-	-	-	-	-
Poly Tubing/acre	$ 958	-	-	-	-	-	-	-	-	-
Water/acre	$ 180	$ 180	$ 180	$ 180	$ 180	$ 180	$ 180	$ 180	$ 180	$ 180
Pest control (deer fence	$ 400	$ 400	$ 400	$ 400	$ 400	$ 400	$ 400	$ 400	$ 400	$ 400
Windbreaks										

B) Variable Cost (LABOR)

A) Pre-Harvest										
Tractor (fuel)	$ 6.37	$ 1.99	$ 1.99	$ 1.99	$ 1.99	$ 1.99	$ 1.99	$ 1.99	$ 1.99	$ 1.99
Skilled Labor										
Labor: planting grass	$ 120.6	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Labor: pepare soil	$ 321.6	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Labor: spread fertilizer	$ 80.4	$ 81.6	$ 82.8	$ 84.1	$ 85.3	$ 86.6	$ 87.9	$ 89.2	$ 90.6	$ 91.9
Labor: b/t row mowing	$ 120.6	$ 122.4	$ 124.2	$ 126.1	$ 128.0	$ 129.9	$ 131.9	$ 133.8	$ 135.9	$ 137.9
Unskilled Labor										
Installing irrigation hours	$ 107.2	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Planting liners hours	$ 428.8	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Hand weeding hours	$ 107.2	$ 108.8	$ 110.4	$ 112.1	$ 113.8	$ 115.5	$ 117.2	$ 119.0	$ 120.8	$ 122.6
Installing mulch	$ 107.2	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Prunning		$ 1,972.1	$ 2,001.7	$ 2,031.8	$ 2,062.2	$ 2,093.2	$ 2,124.6	$ 2,156.4	$ 2,188.8	$ 2,221.6
Interest on costs	$ 98.00									
B) Harvesting										
Harvesting labor	$ -	$ -	$ 605.0	$ 921.1	$ 1,246.5	$ 1,265.2	$ 1,284.2	$ 1,303.4	$ 1,323.0	$ 1,342.8
Harvestor fuel	$ -	$ -	$ 8.7	$ 13.1	$ 17.5	$ 17.5	$ 17.5	$ 17.5	$ 17.5	$ 17.5
Bags	$ -	$ -	$ 123	$ 185	$ 247	$ 247	$ 247	$ 247	$ 247	$ 247
5 Gal buckets	$ -	$ -	$ 1,580	$ 2,370	$ 3,160	$ 3,160	$ 3,160	$ 3,160	$ 3,160	$ 3,160
Packaging labor	$ -	$ -	$ 604.97	$ 921.06	$ 1,246.50	$ 1,265.20	$ 1,284.18	$ 1,303.44	$ 1,322.99	$ 1,342.84

C) Interest Costs

Rollover debt		$ (8,286.89)	$ (10,666.77)	$ (3,562.12)	$ -	$ -	$ -	$ -	$ -	$ -
Interest on costs		(580)	(747)	(249)	-	-	-	-	-	-
Revenue	$ -	$ -	$ 15,406	$ 23,109	$ 30,813	$ 30,813	$ 30,813	$ 30,813	$ 30,813	$ 30,813
Total costs year	$ 8,286.89	$ 2,379.88	$ 8,301.60	$ 10,321.96	$ 12,113.55	$ 12,186.79	$ 12,261.12	$ 12,336.57	$ 12,413.15	$ 12,490.88
Total debt overall		$ 10,666.77	$ 18,968.37	$ 13,884.08	$ 12,113.55	$ 12,186.79	$ 12,261.12	$ 12,336.57	$ 12,413.15	$ 12,490.88
Profit	$ (8,286.89)	$ (10,666.77)	$ (3,562.12)	$ 9,225.29	$ 18,698.95	$ 18,625.71	$ 18,551.38	$ 18,475.93	$ 18,399.35	$ 18,321.62

Elderberry Production for 1 acre over 10 years

			1	2	3	4	5	6	7	8	9	10
Yield	Yield/Acre		-789.4835	914.092	2301.6155	3413.776	4288.2625	4959.764	5459.9695	5817.568	6058.2485	6204.7
	Modeled Yield/Acre		0	914.092	2301.6155	3413.776	4288.2625	4959.764	5459.9695	5817.568	6058.2485	6204.7
Revenue		Price/lb										
	Gross Revenue per Acre	$ 3.00	$ -	$ 2,742.28	$ 6,904.85	$ 10,241.33	$ 12,864.79	$ 14,879.29	$ 16,379.91	$ 17,452.70	$ 18,174.75	$ 18,614.10
Establishment Costs	Site Prep		$ 29.00									
	Bed Prep		$ 1,232.00									
	Planting Stock		$ 1,497.38									
	Planting Cost		$ 226.88									
	Fertilization (establishment)		$ 75.00									
	Permanent Cover		$ 250.00									
	Revenue less Est. costs		$ (3,310.25)	$ 2,742.28	$ 6,904.85	$ 10,241.33	$ 12,864.79	$ 14,879.29	$ 16,379.91	$ 17,452.70	$ 18,174.75	$ 18,614.10
Management Costs	Fertilization (maintenance)			$ 280.00	$ 280.00	$ 280.00	$ 280.00	$ 280.00	$ 280.00	$ 280.00	$ 280.00	$ 280.00
	Pruning			$ 100.00	$ 100.00	$ 100.00	$ 100.00	$ 100.00	$ 100.00	$ 100.00	$ 100.00	$ 100.00
	Weed Control			$ 50.00	$ 50.00	$ 50.00	$ 50.00	$ 50.00	$ 50.00	$ 50.00	$ 50.00	$ 50.00
	Deer Control			$ 349.44	$ 349.44	$ 349.44	$ -	$ -	$ -	$ -	$ -	$ -
	Revenue less Est. /Man. Costs		$ (3,310.25)	$ 1,962.84	$ 6,125.41	$ 9,461.89	$ 12,434.79	$ 14,449.29	$ 15,949.91	$ 17,022.70	$ 17,744.75	$ 18,184.10
Harvesting Costs	Harvesting Cost (Actual)		$ -	$ 182.82	$ 460.32	$ 682.76	$ 857.65	$ 991.95	$ 1,091.99	$ 1,163.51	$ 1,211.65	$ 1,240.94
	Total Revenues		$ -	$ 2,742.28	$ 6,904.85	$ 10,241.33	$ 12,864.79	$ 14,879.29	$ 16,379.91	$ 17,452.70	$ 18,174.75	$ 18,614.10
	Total Costs		$ 3,083.38	$ 962.26	$ 1,239.76	$ 1,462.20	$ 1,287.65	$ 1,421.95	$ 1,521.99	$ 1,593.51	$ 1,641.65	$ 1,670.94
	Net Revenues		$ (3,083.38)	$ 1,780.02	$ 5,665.08	$ 8,779.13	$ 11,577.14	$ 13,457.34	$ 14,857.91	$ 15,859.19	$ 16,533.10	$ 16,943.16

Conclusion

Reflecting on each of the three agricultural startup projects helped me realize the knowledge and skill sets I acquired completing them. Without question these three projects have had a major influence on my future career path.

When reflecting on the work completed with Interlochen and my review of literature on the School Farm Movement, I am glad that I did this work and feel that I benefitted significantly from it. Not only did I learn a lot about starting up a successful k-12 school garden or college or university student farm, which is a potential career option for me, I was able to provide this information to Interlochen to help them as they decide how to proceed with their school garden project. At first, my work with Interlochen looked promising, they seemed committed to spending the time and money to develop a school garden and education center. However, as of now, they are postponing plans on the project. I was offered a position to continue my summer work at Interlochen in February of 2018. This was a very difficult decision. The position paid well at $20 per hour. In the end, I decided to not take the position. I made this decision based on what I had learned writing the review of literature on the Student Farm Movement. This project led me to know what it takes to have a successful school garden or student farm. After multiple talks with Interlochen it did not seem that they were going to increase the scope of the project to the level necessary to create and sustain a successful school farm. I also realized that as the position was currently defined, the work was not going to be a challenge for me. In the end, I believe I made the right decision not to take the position. Conducting the review of literature on the Student Farm Movement has provided me with a wealth of knowledge on how to plan and operate successful student farms and school gardens. I know this information will be invaluable when I apply for similar work.

When reflecting on my independent consulting work for Food For Thought, I once again feel very fortunate to have had this opportunity. I really enjoyed doing this work and believe that I am relatively good at it. I enjoyed explaining to the leaders of the organization how raspberry production works and developing a plan for them. Of course, there were also many frustrating components to this work. First, it was often difficult to explain many of the agricultural concepts to the organization's leaders as they are not actual farmers. Second, I found it difficult explaining to the organization's leaders just how much mental work and time it would take to make this project happen. They seemed too excited about the idea and the "sex appeal" of having two very large hoophouses full of raspberries to fully grasp how much work it entailed. I suspect their inability to understand the complexity of farming is not that uncommon. We humans tend to think that the work of others is far less complex than it really is. Third, I found it frustrating to be making recommendations to the organization on what they should do but not be able to follow through and make sure that the recommendations were completed. Of course, I understand that this comes with consulting, you only get to provide recommendations, not make and implement decisions. Although it has not yet been decided whether they are going to move ahead with this production plan, I fear that they may move ahead with the project but not do a good job managing it themselves and consequently the operation will fail. They need to hire an actual farmer to oversee the project and thus I included such a position in the production plan.

I billed Food For Thought $5,000 for the consulting work I did for them. I am confident they received a good deal for the amount of time, knowledge and expertise I put into their enterprise budget. It made me realize how valuable this kind of work is, offering expert advice to new alternative farm enterprises. Prior to this experience, I never really considered performing this kind of work. After the experience, I realized that I found helping others to be

extremely rewarding. I also realized it could provide small scale farmers, like myself, with alternative job opportunities. But at the same time, it frustrates me because I know that most small farmers cannot afford these types of consulting services. That is why working for extension is such an appealing career option to me. In such a position, I could help farmers with their farm startups and hopefully the cost would be all or at least partially covered by extension.

In the past few years I have seen more and more educational opportunities arise for beginning farmers. University extension courses are being offered on vegetable production. Michigan State University has a two-year farm training program. These courses and programs provide potentially affordable opportunities for young people to learn about farming. Extension programs often provide outreach and educational opportunities to farmers at no cost or at least at reasonable prices.

As a consequence of this second project I decided to pursue the possibility of teaching agriculture related courses through extension. I am very happy to report that I have been approved by Michigan State University to teach their Vegetable Production class at Northwestern Michigan College, located in Traverse City Michigan spring semester, 2019.

I also learned a great deal in my third project which involved starting up my own farm, Lakeview Hill Farm. I have secured funds in FSA Loans for operating expenses and capital infrastructure. I have also been approved for a $20,000 grant for a 20 kW solar panel system and farm scale high efficiency gasification wood boiler heating system. I began construction on a polebarn/house and the exterior is completed. In the summer of 2017, I constructed a 34’ x 148’ greenhouse which is already in production. I have been approved for $14,000 worth of NRCS EQIP funds submitted for items such as a forest management plan, windbreaks, cover cropping, and native pollinator habitat installation. While this project is only in its infancy, I do not feel as

isolated as I did in my previous farm startup. This is because I am currently pursuing outside work consulting, teaching other farmers, and helping to further develop a growers Co-op for Northern Michigan. But I have also received emotional support as my farm is imbedded in a larger community of small scale farmers. I am as overworked as I was with my previous farm startup but again I am also receiving considerable help from my significant other, neighbors, parents, friends and colleagues.

I have taken many of the learned lessons and mistakes made from my previous farm and applied them to Lakeview Hills Farm. First, and most significant to me, I plan to simplify the farm in the number of crops I am growing. I am still a strong supporter of crop and biological diversity. But at Spirit of Walloon we grew around a hundred different crops and it was simply too mentally complicated to keep track of and manage that many different crops. I plan to produce around 20 different annual vegetable crops at Lakeview Hills Farm. I also plan to keep the farm small, but mechanize the farm as much as possible. At Spirit of Walloon we were proud of how much of the work we did by hand. Although, this might be environmentally sustainable, it is not physically sustainable. I can handle the hard manual labor now, but I know that if am going to continue this work I am going to have to take a large load off my back. I am also planning to move away from relying on seasonal interns as labor to having part to full time year-round employees with a short winter break. This will cost more than interns, but I believe that a higher quality of work will be produced. Also, I believe employees will be more reliable and consistent than interns.

When looking back on the time and energy I have spent starting up two farms as an independent business owner, one thing is clear. Owning a farm business is the most challenging and, at times, frustrating work I have ever done. I often find myself complaining about how

much money other people make for what I often ignorantly and prejudicially consider "worthless and invaluable" work, while, in my opinion, most farmers are making below minimum wages and are undervalued. In so many ways I feel as if farming has chosen me, rather than I have chosen farming. I'm well aware of all of the costs that come with farming, the time, money, and energy that it all demands. That, no matter how much I might want to take a break from photosynthesis and other plant physiological functions, the farm does not. Somehow through all of the bad weather, frustratingly slow days where only two of the ten jobs that needed to be completed were, and crop failures, I still can find myself almost constantly thinking about how to better wash carrots, or how to juggle the crop rotation in the fields. My greatest fear, when it comes to operating a farm business, is that while I can feed and house myself from my farm now, I'm not sure I will be able to do it in the long run. Health insurance, retirement, overworking and burnout, and raising a family with low income are all issues that I often find myself dwelling on and worrying about when thinking about farming as a sole career. This is why, the experiences discussed in this portfolio, managing a student farm or school farm, independent consulting or working for extension, are important career options for me to supplement my life as a farmer.

I feel fortunate and know that I am in a career-choosing position, I have the time, resources, and privilege to be able to choose to farm or not to farm. But it has chosen me and there is no turning back now. I love the independent, physical work that it entails. I also find a balance and appreciation for the interdisciplinary skills and jobs required for farm work. But, what I appreciate most about owning a farm is that I feel I am the one who benefits most from all of time and work I put into the business. Of course, I hope the customers and community benefit greatly in many ways too! But I am a task oriented person, and I am very good at defining and creating a vision of what I want to do with my farm and how to do it. I find it easy to work

towards and stay true to that vision without becoming overwhelmed or feeling lost. This is why, having my own farm will always be my main career choice.