It Takes a Village to Raise A Salad:
The Development of the Student Organic Farm and Community Supported Agriculture Program at Michigan State University

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Dedication

This story is dedicated to all student farmers, past and present, at the MSU SOF, whose hard work, inspiration, love of the soil and each other, laughter, and dedication constantly re-creates this place . May the farm light a little fire in your heart, your soul, and your community, and may you always have fresh greens on your plate.

Abstract: Student farms have historically played an important role in experiential education at North American colleges and universities. Since the 1990's a new wave of student initiated farms and ecological agriculture programs has developed, among which is the MSU Student Organic Farm (SOF). Community Supported Agriculture (CSA) is a mutually beneficial farm business model: a relationship among people who grow food, people who eat food, and the land where it is grown. Members support the farm by paying in advance for a weekly share of the harvest . The MSU SOF has pioneered a new twist on CSA: in addition to traditional-season, or "summer" farming, we've experimented with winter production using unheated greenhouses and cold storage, to supply members with fresh, high-quality, locally grown, organic produce 48 weeks per year. Members are primarily MSU faculty, staff, and students. Farmers are student workers, both paid and volunteer, most with little farming experience or education. We found that this student farm can successfully produce fresh vegetables throughout the winter. The biggest challenges to date are organizational structure, communication, and delivery of information to a wide audience including student workers, volunteers, and tour groups. This report documents the development of the farm from an idea among undergraduate students in 1999 to its current state in 2005, on the brink of developing a new certificate program diversified, year-round sustainable agriculture. The SOF can help MSU meet its responsibility as a land grant institute to educate the public about agriculture, as well as its charge as a major research university to engage undergraduates in research based learning.

Introduction

2005 marks the 150th anniversary of Michigan State University, the oldest land grant college in the nation. As a leader in agriculture and horticulture, MSU is uniquely positioned to take the lead in determining the future of agricultural education for undergraduate students, and hence the face of agriculture and food systems in Michigan and the nation. Ecological agriculture as a discipline is just emerging into the common academic arena (Parr, 2003) and holds rich opportunities for research. Ecological and organic agriculture is under-researched, under-funded, and under-represented in university curricula, but undergraduate students are ready to change that. In a masters' thesis on the Student Experimental Farm at UC Davis, Damien Parr (2003) determined that students initiated student farms in order to "create their own curriculum," one that served their interests and priorities in ways in which extant agriculture education programs fall short. Early in the history of the agricultural college, all MSU students were required to work on a college farm as part of their college education (Murray, 2000). That requirement fell by the wayside, but students are bringing it back, along with an ethic of sustainability, a conviction that our current food and economic systems are not in line with their values, and a desire to get their hands in the dirt all year long. A forward-thinking ecological awareness, in conjunction with a rich agricultural history, has brought about the current renewal of the student-run farm system at MSU, in the form of the Michigan State University Student Organic Farm and Community Supported Agriculture program.

Why would one want to put together sustainable farming, Community Supported Agriculture, a student-run organization, winter farming, and experiential education? On a

personal note, I can say that I feel I've learned more in my five years farming (interspersed with college degrees) than in 21 years of formal education. And also that without my university exposure to concepts of ecology, sustainability, biological and social community interactions, economics, plant propagation, food security, and human nutrition, farming would appeal to me on far fewer levels, and the challenges might appear to outweigh the benefits. It is precisely the synthesis of formal education, theoretical considerations of sustainable agriculture and local food systems, and real-world farming experience that has led me to believe in the value of farming within a university education. There is, as in every great marriage of worthy ideas, an emergent property of empowerment through engagement on a student farm that is greater than the sum of the opportunities in school and on a farm. On a student farm, students are constantly thinking on their feet, while physically laboring, while reflecting on the impacts of one's immediate and long-term work. This combination brings together the metaphorical world of the typical university experience with the empirical knowledge that comes from tangible problem solving in a peer community.

This paper is a story. It's the story of an ambitious and sometimes delusional group of visionary thinkers and do-ers at Michigan State University, and the farm and community that has grown out of our dreams and labor. It's a story about inexperienced and committed student farmers and faculty creating a physical farm and a community of Community Supported Agriculture share members in less than a year and living to tell about it. Part of the story is about trying to pick up the pieces and get our collective feet under us, while moving full speed ahead. As the first farm manager, my own engagement with this process has made it difficult to step outside far enough to make

what I consider objective observations. Much of what follows is accordingly subjective. The somewhat fuzzy, still evolving, overlapping concepts in this paper reflect in both content and form the state of the farm in question, and of my own experience there. As Laura Delind (1998), anthropologist and one-time CSA farmer, states, "we can (and should) learn from experiences that are less than perfect, that do not unfold according to plan." It is my hope that this account provides some small insight into the challenges and opportunities associated with creating a year-round CSA program on a working student farm, and helps smooth part of the way for other student farms considering year-round CSA.

As I write this from a near-comatose state, sunburned, computer weary, brain fried like the famous eggs in the "this is your brain on drugs" TV commercial, mind fairly pickled, there are students working in the fields and greenhouses of the SOF. It's happened! It is really there; we really did this, you, the reader, are really invited to come visit and see for yourself. In the following pages, I attempt to document the bittersweet evolution of this amazing place, giving laud and thanks to the individuals who midwifed it into being, describing the convoluted paths we've barged down at full speed (and are still on), and finally, offering my suggestions for future directions. This is only one tired farmer's account; many, many stories have combined to make this place real; many, many stories are true.

Chapter 1

Background and Compendium of Resources for Ecological Agriculture Education Farms

Student farming is inherently what we've come to consider "interdisciplinary," and so must be our thinking about student farms. The following review is not intended to be an in depth review of literature of any single topic. The intent is to briefly outline key and readily available references that are suggested as recommended reading for students, staff and faculty developing or operating a campus based educational organic farm. The topic areas include 1) farming practices, 2) season extension and winter harvesting, 3) community supported agriculture, 4) agriculture and experiential education and 5) student farm related literature.

1. Organic and Sustainable Farming Systems and Practices

Perhaps the most-referenced book at the MSU SOF is Eliot Coleman's *New Organic Grower* (1989), a very basic, yet comprehensive review of his experiences growing organically at his farm in Maine, on the site of Helen and Scott Nearing's former homestead. He also discusses farming practices in France and the Mediterranean area. His practices are based on a long tradition in that area of the world of local food production and good land stewardship. He discusses soil fertility, crop production and rotation, labor, marketing, varietal selection, livestock, and mentions winter gardening. This book and its companion, *Four Season Harvest*, in which he discusses his pioneering work in season extension in Maine, comprise the bulk of our pool of farm literature, and are the two books that new student farmers are recommended to read first.

The Northeast Organic Farming Association recently published a series of handbooks on organic principles and practices, including books on crop and soil health, fertility, marketing, seed saving, and poultry and milk production. *Organic Weed Management* and *Organic Soil Fertility Management*, both by Steve Gilman, provide simple but accurate overviews of weed and soil ecology, respectively, and discuss practical approaches to improving weed and soil fertility management on small farms.

Another good source of start-up information is Dan Guenthner's "Tools of the Trade: Hand tools, appropriate technologies, and equipment for the small scale market garden" (1992), in which Guenthner discusses his own entry and growth in farming, in the context of a comprehensive review of farm tools. I was fortunate enough to attend a workshop with Dan at the Upper Midwest Organic Farming Conference in Wisconsin in 1999, about starting a small scale market garden. The information from that workshop has proved as valuable a resource as any published work.

A wonderful source for free, science-based topical articles on all aspects of sustainable agriculture is ATTRA, or Appropriate Technology Transfer for Rural Areas, a program of the National Center for Appropriate Technology (www.attra.ncat.org). SARE (http://www.sare.org/) is another excellent source of forward-thinking agriculture-related information and grants.

A rich and diverse source of information for the small-scale, organic, sustainable, or otherwise "alternative" farmer is the NewFarm online journal (www.newfarm.org), sponsored by the Rodale Institute, one of the original bastions of organic farming and gardening. *Growing for Market* (www.growingformarket.com) is a monthly publication out of Lawrence, Kansas, written by and for market farmers and gardeners. It typically

includes national organic news, standard columns on flower and vegetable production, farm classifieds, and feature articles on anything from specialty crops to pest control to agro-education, and more.

For crop storage and post-harvest handling, the USDA Handbook 66: he Commercial Storage of Fruits, Vegetables, and Florist and Nursery Stocks (2004), on line at http://www.ba.ars.usda.gov/hb66 , offers complete and accurate information about each crop's requirements and tolerances. Nancy and Mike Bubel's *Root Cellaring* (1979) is a handbook for low-input, low-tech storage of fruits and vegetables using root cellars. *Keeping Food Fresh* (Aubert, 1999) is a manual of pre-industrial, low-energy food preservation and storage techniques, published by Terre Vivante, a demonstration farm center in France which teaches and publishes information about sustainable food production and preservation.

Most recently, my favorite farm reference has been *Whole Farm Planning* (Henderson and North, 2004), a Holistic Management (HM) -based approach to farm planning and management. It is part of the same NOFA series as Gilman's *Weed* and *Soil Fertility Management* handbooks and is an equally, if not more so, wonderful and accessible reference. Henderson and North present HM concepts in the context of their own small-scale, sustainable farms, and recommend strategies to improve management on any working farm. It covers topics like assessing the whole, goal setting, making decisions, choosing appropriate tools, and testing decisions and monitoring results. They also include discussions of and references about holistic approaches, alternatives to mainstream business models, and other farm planning organizations and resources. Anne and Eric Nordell, farmers in Pennsylvania, edit the *Small Farmer's Journal* (SFJ)

(http://www.smallfarmersjournal.com/.docs/pg/about.html), a quarterly publication with an emphasis on sustainable horse farming, but with a wide range of small farm and rural life topics. The Nordells also published a compilation of some of their articles from SFJ, titled *A Whole Farm Approach to Weed Control*, in which they describe their two-season cycle of field preparation and production, the "summer fallow," timing of cover crops and shallow tillage, and specifics of horse-drawn implements and horse farming systems.

For a description of the process and requirements of obtaining USDA organic certification, see the USDA's National Organic Program (NOP) web page at http://www.ams.usda.gov/nop/indexIE.htm. For a description of the process by which the NOP standards and guidelines are developed, see the web page of the National Organic Standards Board, the agency which develops the NOP, at http://www.ams.usda.gov/nosb/index.htm.

For farmers in the Midwest, perhaps one of the best education opportunities comes at the annual Upper Midwest Organic Farming Conference (UMOFC), sponsored by MOSES, the Midwest Organic and Sustainable Education Service (http://www.mosesorganic.org/). It's the largest sustainable agriculture conference in the country, and brings together experienced and new farmers, researchers, and educators from all over the country, but particularly the upper Midwest. The binders from the UMOFC's one-day Organic University courses (all-day intensive courses that precede the main conference), as well as handouts from farmer presenters in workshops, contain some of the best information available on ecological agriculture in this region.

2. **Winter Farming**

Winter farming in the temperate zone is an emerging interest on the part of small scale, sustainable farmers, having its roots in Europe and Japan, and more common on the east coast of the US than in the Midwest. While the techniques are still being refined, and scientific research is limited, winter farming has the potential to help localize food systems. It offers farmers the option of extending their growing, and hence, selling season, and increasing or perhaps leveling out the seasonal farm income fluctuation. For a student farm, winter farming can provide students the opportunity to grow crops while they're in school, rather than during the upper midwest traditional farm season. It can also provide leading-edge training in a technical setting, preparing new farmers to take advantage of a market niche, that of fresh, local produce in the winter.

Season Extension and Winter Farming Literature

Eliot Coleman's *Four Season Harvest (*1992*)*, companion book to the *New Organic Grower* discusses, in accurate and complete detail, his experiences to that point in winter crop production. He discusses basic tenets of winter farming, such as latitude, choosing the right crops, various weather protection techniques, winter greenhouse specifics, storage crops, marketing, and joys of high quality, fresh greens in winter. Coleman's most recent publication, *The Winter-Harvest Manual* (1998) is self published and available from www.fourseasonfarm.com or www.growingformarket.com. He explores some aspects in greater detail and includes his more recent experience with winter farming systems. He gives credit to Dr. E.M. Emmert of the University of Kentucky for publishing the first known study of winter vegetable production without

supplementary heat, back in the 1950's. Dr. Emmert trialed several systems of winter crop production, the most memorable (to Coleman, anyway) of which is his use of an inner layer of plastic inside plastic greenhouses, for winter farming with no supplemental heat. Coleman discusses Emmert's systems, the systems of growers in Europe, and his own.

Steve Moore is perhaps the next best loved farmer-author at the SOF. His farm in Pennsylvania uses low-input season extension techniques to grow and sell food all year, and he gives talks and guest lectures around the country and has published articles in *Growing for Market*. *Growing For Market* recently (2003) published a compilation of articles by farmers, called *The Hoophouse Handbook - Growing produce and flowers in hoophouses and high tunnels.* This handbook covers topics like hoophouse design and construction, profitability, vegetable crops, and cut flower crops for winter.

Poisson and Poisson's *Solar Gardening Growing vegetables year-round the American intensive way* (1994) provides excellent garden-scale discussion and instruction for low-input winter production. Additonal basic season extension and winter gardening information can be found in *Gardening Under Cover: A northwest guide to solar greenhouses, cold frames, and cloches*, by Head (1984), and Colebrook's *Winter Gardening in the Maritime Northwest: Cool season crops for the year-round gardener* (1989). *Growing For Market* recently (2003) published a compilation of articles by farmers, called *The Hoophouse Handbook Growing produce and flowers in hoophouses and high tunnels.* This handbook covers topics like hoophouse design and construction, profitability, vegetable crops, and cut flower crops for winter.

3. Community Supported Agriculture

Community Supported Agriculture, or CSA, is a unique business model, a mutually beneficial relationship among people who eat food, people who grow food, and the land where it is grown. At its most basic, CSA provides farmers with start-up funds in the beginning of each year, from members who have pledged to support the farm financially. Eaters (members) in exchange receive a share of the harvest, usually weekly. CSA farms range from purely member-driven participatory farms in which members make decisions, draw up budgets, do much of the farm work, and recruit a farmer to work "for" them to a less personal "subscription" system in which farmers instigate the relationship and make the decisions, often as a revenue component in a diversified direct market farm. I believe the true power and beauty of CSA lies not in the impersonal "subscription" programs, but in the relationships that emerge between farmers and members, and among communities of members, local people with common interests in healthy food, supporting local farmers, healthy agroecosystems, and alternatives to the competitive open market economy for procuring their food. They might not know they're interested in all these things when they first join a CSA, but the education potential is rich. CSA provides a venue for ecologically and socially aware people to "put their money where their mouth is," literally, by directly supporting local farmers, keeping the local economy and rural livelihood strong, keeping open space open and farms farmed around metropolitan areas, and, typically, supporting sustainable and organic land stewardship and farming practices. In a student farm setting, CSA can provide students the opportunity to interact directly with members and consider our

dominant paradigm of commodity agriculture and the competition-based economy from the perspective of a viable alternative.

Community Supported Agriculture (CSA) Literature

The seminal work on Community Supported Agriculture is *Sharing the Harvest* by Elizabeth Henderson with Robyn Van En. Van En is widely credited with starting the American CSA movement. Together with Jan VanderTuin she started a CSA farm in Massachusetts in 1986, which is still operating as a CSA, Indian Line Farm. VanderTuin brought the idea of CSA from an agricultural purchasing collective in Switzerland, who had gotten the idea from the teikei movement in Japan. Teikei started in the 1960's when a group of Japanese home makers, alarmed at the trend toward low quality, imported foods, banded together to ensure the continued availability of high quality, local produce and food products by formalizing purchasing arrangements with local producers. The Swiss group adapted the model to their own needs, and when VanderTuin came to Indian Line Farm, CSA was launched in the US. Van En's guide *Basic Formula for Community Supported Agriculture* was published in 1988 and served as inspiration for the more comprehensive *Sharing the Harvest*, which Van En started writing before her death in 1997, at which point her friend and colleague Elizabeth Henderson took over finishing and publishing the book. Currently the Robin Van En Center for CSA Resources is located at Wilson College in Pennsylvania, and it offers services and literature to new and existing CSA farms and members nationwide. See www.csacenter.org for a complete list of their publications, videos, and other materials. The Center for Sustainable Living, also at Wilson College, published the *Community Supported Agriculture Handbook* (Treichler

and Moore, 1998), a manual created to "promote CSA as an innovative and workable model of a sustainable food production system," along with audiovisual and other print materials. The manual and other supporting materials are available from the Community Agriculture Project (CAP) at Wilson College.

Trauger Groh is another highly acclaimed biodynamic community farmer and author, having started the other founding CSA in the US, also in 1986, Temple-Wilton Community farm in New Hampshire, and published *Farms of Tomorrow* with Steve McFadden (1990) and *Farms of Tomorrow Revisited: Community Supported Farms-Farm Supported Communities* (Groh and McFadden, 1997). *Farms of Tomorrow* sets out basic background and practical lists of what is needed to create and how to move toward the farms of tomorrow, with philosophical roots in Rudolf Steiner's Biodynamic Agriculture theories. In *Farms of Tomorrow Revisited*, Groh continues his discussion of the component parts of CSA and biodynamic farms, and McFadden presents interviews and case studies of early CSA farms.

For one of the first scholarly treatments of CSA, as it existed in the US in 1995, see Timothy Laird's master's thesis from University of Vermont: *Community Supported Agriculture: A study of an emerging agricultural alternative* (Laird, 1995). Laird conducted a comprehensive survey of the 165 identifiable CSA farms in existence at the time, and reported information such as CSA farmer and member base demographics, acreage, organic and conventional practices, membership, organization and operation, decision-making, finance and marketing, community building, and goals and objectives, for both successful and failed CSA farms. His findings are frequently cited in *Sharing the Harvest*. More recently, the Northeast Sustainable Agriculture Research and

Education Program (SAREP) funded two surveys of CSA across the nation, one in 1999 and one in 2001, reported by the Center for Integrated Agricultural Systems (CIAS) at the University of Wisconsin-Madison, in collaboration with the Department of Resource Economics at University of Massachusetts-Amherst, Northeast SAREP, and the Roby Van En Center (Lass et al, 2003). One interesting finding in these comprehensive surveys was that CSA farms are concentrated in three geographic regions: the northeast, west coast, and north central states. Of the north central states with farms that responded, Wisconsin had the most survey respondents (26), while North Dakota had the fewest (1). Michigan had eight. The reports focus on patterns of diversity in farming operations, land tenure and business structure, age and gender, and income, and patterns of uniformity in geography, sustainable practices, farm and enterprise size, core groups, ethnicity, education, and commitment to CSA by farmers. They provide snapshot pictures of the state of CSA and CSA farmers in the US. More recently yet, the Leopold Center for Sustainable Agriculture at Iowa State University published *Community Supported Agriculture (CSA) in the Midwest United States: A regional characterization* (Tegtmeier and Duffy, 2005). This report looks at demographics of typical upper Midwestern CSA farmers, farmer motivations, membership, share prices, labor, profitability, and farmer and member satisfaction. All of these reports portray an overall positive outlook on the part of CSA farmers, though not all farms are profitable. In my experience as well, CSA farmers, as well as other alternative, sustainable, or nontraditional farmers, tend to have a positive outlook for agriculture and their own livelihood, as compared with traditional or commodity farmers (EFFS panel, 2005).

Laura DeLind, professor of Anthropology at Michigan State University, and former CSA farmer, conducted a survey and analysis of CSA farms and farming in Michigan in 1998 (DeLind, 1999a), and again in 2002 (DeLind, 2003). She compared farmer and member demographics and motivations, risk management, organic certification status, community outreach, and farmer-reported recommendations and needs. Education of consumers about food systems and farming practices and education of farmers about growing techniques were found to be the greatest reported needs. DeLind has also written extensively on CSA as an alternative to the chemical-industrial model for food systems (e.g. DeLind, 2002) and on the role of gender in CSA (DeLind, 1999b).

4. Agriculture Education and Experiential Education

John Dewey is commonly cited as the father of American experiential education thought. *Experience and Education* (1938) analyzes both traditional and progressive education of the time. In it, he describes his basic ideas of experience, freedom, purpose, contextual learning, and finding meaning particularly in elementary educational activity. David Kolb's 1984 *Experiential Learning* proposes a four-stage learning cycle concept composed of concrete experience, reflective observation, abstract conceptualization, and active experimentation. These two authors have primarily shaped my recent thinking about experiential education on the farm. Most experiential education literature addresses the needs of elementary students, some deal with secondary education, but very few works address post-secondary experiential education. That said, some studies from *agricultural* education (not specifically *experiential agricultural education*),

epistemology, and systems thought lend insight into the learning and teaching potentials on a student farm. Knobloch (2001) synthesizes the social and educational theories set out by early framers of experiential learning in agricultural education, specifically Knapp, Dewy, Lancelot, and Stimson. Francis et al. (2001) present a discussion of challenges in the design of ecological agriculture education. They propose a way forward through a deliberate blending of methodologies from social and natural science disciplines, with no line between teachers and learners, and the adoption of systems thought as opposed to a discrete disciplines approach. They discuss effective strategies for communicating this new hybrid information and theory to more traditional academic colleagues.

Richard Bawden (1994. p. 258), reflects on his experiences trying to bring a "critical and systemic learning approach to the process of institutional reform" at Australia's Hawkesbury College, and asks us to consider how organizations collectively learn, and how to transcend existing norms for implementing desired changes. His discussion of collaborative learning and institutionalized learning systems are, in my mind, good starting points for discussion of systemic changes at our farm, and for any organization considering implementing learning programs that differ from the status quo. Two rich sources for agricultural education materials (manuals and descriptions of training programs) are the Michael Fields Agricultural Institute in East Troy, Wisconsin (www.michaelfieldsaginst.org) and the CSA Learning Center (www.CSALearningCenter.org) at Angelic Organics in Caledonia, Illinois, which offers materials and participation in its Collaborative Regional Alliance for Farmer Training (CRAFT) program, an organized group of new and entry-level farmers collaboratively learning from each other via field trips and discussions.

5. **Student Farming in the United States**

The culture of student farms associated with college education in North America dates back to the mid-1800's. For example, Berea College in Kentucky has had working educational farms on site since 1855. Warren Wilson College of North Carolina has had a farm work program in place since 1894, and California's Deep Springs College's working farm has been operational since 1917. These farms have been an integral part of the curriculum at these schools since their inception, based on the early American Jeffersonian agrarian ideal of the yeoman farmer.

In the 1960's and 1970's, another type of college farm grew out of the "back to the land" philosophy of students and faculty on politically active campuses, e.g. UC Santa Cruz in 1967, UC Davis in 1977, Hampshire College in the late 1970's. All of these farms are still in existence, with agroecology curricula or certification programs and integrated academic programs.

The early 1990's saw another new flush of college or student farm projects develop across the nation, with heavy concentrations on the east coast (Cook College at Rutgers in 1993, Black Bear Food Guild at UME in 1994, NCSU in 1994, Penn State in1995, UVM in 1995, Central Carolina Community College in 1995, Bennington College in 1996, Cornell in 1996, Dartmouth College 1996, Green Mountain College in 1997, College Of the Atlantic in 1999, and Vassar College in1999.) In the Midwest, Oberlin College started a student farm 1995, and IA State in 1999. In the west, Cal Poly Organic Farm started in 1989, Humboldt State in 1993, Prescott college student farm started in 1996, Stanford in 1997, U Montana in 1997, CO State in 1998, and Santa Rosa

CA Jr. College in 1999. The student farm wave has continued into this decade (millennium)with NMSU- Las Cruces, Yale, UNH, Middlebury College, VT, St. Olaf College, UMN, Northland College, UW-Madison, College of the Redwoods, OR State, WA State, UBC, and Michigan State student farms all developing since 2000.

Student involvement at college farms ranges from extra-curricular volunteer gardening at UW-Madison and CO State to the Warren Wilson requirement of all students to work as part of their undergraduate curriculum, to the University of Maine student run CSA housed on a university-run experimental farm. Most of the farms that have been in existence for at least three years have some sort of for-credit curriculum connected to the farm. UC-Santa Cruz and Central Carolina Community College both offer highly specialized training courses, in biointensive growing, and sustainable small-scale farm practice and operation, respectively. One common denominator of all student or college farms is the opportunity for active learning in an experiential education environment. The learning that takes place on a farm, whether it takes place while a class builds a compost pile, or a crew of workers tries to figure out the best way to mulch an acre of potatoes, is different from classroom or book learning, and is, I believe, an indispensable part of education.

Student Farm Literature

There is very little peer-reviewed literature on college-level student farms. The resources that do exist include one wonderful article by Ann Clark and Jacinda Fairholm (2002) on skills that new farmers need, but agriculture schools don't currently offer. They surveyed 25 schools in the US and Canada with either traditional or experiential

programs in organic agriculture, and compared programs. They found that organic agriculture education is an open niche, that offering courses and programs in organic agriculture is perceived to attract new students, that a major constraint is lack of funding for basic organic research, without which a high quality organic curriculum cannot be developed, and that organic curriculum remains tangentialized, rather than holistic or comprehensive, in most schools. Their findings should be of particular interest to curriculum designers, administrators, and research funding organizations.

The most useful "publication" we've employed at the SOF is the Cook College Student Organic Farm (at Rutgers University) handbook, available online at http://aesop.rutgers.edu/~njuep/csof/handbook.html. It's a binder with information about everything from the farm's history to how many celery seeds to use per flat in the greenhouse. As a manual for their own farm operation, it's exhaustive and handy. It has served as a template of sorts for our own student employee and intern manual (see Appendix C). Eventually our manual, or parts thereof, will be available on our web page, as well.

Without a doubt, the richest source of information on student farms is other student farms. The student farm directory at the NewFarm website (www.newfarm.org) offers the necessary information to find and contact over 50 farms around the country. This list is organized by geographic location. Each farm is listed with its name, size, years in operation, primary activities or goals, and most also have a link to their web pages. According to NewFarm (2005), a similar directory of educational institutions offering programs in ecological agriculture is in the works, in collaboration with MOFGA, the Maine Organic Farm and Garden Association. At the 2005 Upper Midwest

Organic Farming Conference in La Crosse, WI, student farms and student farmers convened a round table discussion of starting a student farm network across the country. Dan Sullivan, a senior editor with NewFarm was present for the discussion, and now NewFarm also hosts a discussion forum for student farmers nationwide.

Chapter 2

The MSU Student Organic Farm in 2005:

How Far Have We Come and Where Do We Go From Here?

The MSU Student Organic Farm, as an organization and physical entity, has morphed considerably in its 2.5 years of existence. It was preceded by the registered student organization (RSO) or club called the Student Organic Farm Initiative or SOFI, which had grown out of another RSO called the Michigan Sustainable Agriculture Network (MSAN). The SOFI existed before there was a farm, existed for the express purpose of creating the farm, from 1999 to 2004. In the fall of 2004, SOFI, its stated mission accomplished, re-merged with MSAN and renamed itself Ecological Food and Farm Stewardship (EFFS). The first MSU course offered on "What is Organic?" took place in 2000, with many of the students from the SOFI in the class. Faculty advisor John Biernbaum's research into greenhouse production or organic edible flowers and herbs (1997-2000) and winter production of baby leaf salad greens (2001-2003) has played a large role in the farm's initiattion and operation. The physical farm, the CSA,

and all its constituent functions, however, have been around for a much shorter period. Greenhouse construction at the farm started in the fall of 2002 and the CSA started the spring of 2003. The amount of change over those past 2 ½ years is significant. The farm has a longer story, of course, than my time here, with much of the history detailed on the farm's web page: www.msuorganicfarm.com.

1. Key People

The farm is of course a physical place, but the story of the SOF is about people who have developed this unique project. While details about our personnel won't allow another farm to recreate what we did, hopefully it will shed light on the importance of personality and social dynamics at the SOF, and hopefully it will be translatable, to help others think about the roles individuals can best play at their farms. This is our "village":

There are two faculty advisors to the MSU SOF, Dr. John Biernbaum and Dr. Laurie Thorp. John was mainly responsible for securing the original Kellogg grant money that funded the construction of the three newer hoophouses, purchased supplies, and paid for startup labor. He located and purchased the hoophouse kits and materials, as well as many of the tools and greenhouse supplies, some of which were donated to him from the greenhouse industry and passed along to the SOF. He has been, and continues to be, the primary link to the horticulture department. One of John's driving interests in the student farm has been exploring winter production of cold-tolerant crops. In 2001 he began researching low-input winter production of baby leaf salad greens in unheated hoophouses in Michigan. Part of the obligation written into the Kellogg grant that provided the farm's start-up funds was the continuation of that research, expanded across

a wider variety of crops. So John has designed and implemented the interior layout and planting schemes inside the hoophouses to facilitate data collection to further that research. He has also been primarily responsible for the farm's finances and budget. Laurie Thorp and John co-wrote the USDA grant that funded the educational programming on the farm, and Laurie has served as the experiential education point person. She is the director of the undergraduate RISE (Residential Initiative for the Study of the Environment) program, and as such has funneled both ecologically-minded students and resources to the farm and its operations.

Melissa Timm-Cook, a part-time research technician, is the data collection and management point person. Melissa has worked with John and the baby salad greens research project since its inception in 2001. Her role at the farm has been designing winter crop plans, transferring all the farm records from the farm hard copies to the computer back at the lab on campus, compiling and analyzing all that data, serving as liaison between John's research plans and the actual, on-the-ground farm activities, and, as the person with the most winter production seasons under her belt, serving as a winter farming resource.

There are two farm co-managers, one, myself, a masters' student in horticulture, the other, Jeremy Moghtader, a part-time university employee. The farm co-managers are primarily responsible for crop and farm planning, mentoring interns and employees, short-term financial budgeting, working with John to procure supplies, supervising and refining daily and seasonal farm operations, as well as overseeing the CSA business management. Before Jeremy came on the scene, I, along with several very capable student farmers, handled all of those duties. In my early days here, I

- created the CSA member database and financial record-keeping system
- developed communication systems among farmers and between farm and CSA members
- served as the primary contact person for CSA members for the first 1.5 years
- recruited and fielded questions from prospective members
- developed, along with Melissa Timm-Cook, most of the record-keeping systems we use at the farm
- established seed ordering practices and records and accounts with the seed companies
- constructed, with lots of help from John and the first batch of summer student farmers, the basis of our current irrigation system
- coordinated and supervised employees and volunteers in daily farm work
- learned, on the fly, enough about winter farming to pull off a year-round CSA, with plenty of help from Melissa, John, and a few books (primarily Eliot Coleman's *Four Season Harvest*).

Some of Jeremy's key roles have been to help us focus on long term field and farm plans, including cover cropping, developing a semi-permanent bed system, and fine-tuning our crop rotations, as well as building organizational structure and improving decision-making strategies and communication.

Another masters' student, Emily Reardon, is the education and outreach coordinator. Emily's primary roles at the farm have been scheduling and leading tours and classes on farm visits, organizing volunteers, stepping up to help us manage the farm, and setting the pace in field work.

Currently, a wonderfully capable graduate student volunteer, Cristin Popelier, manages the office end of the CSA business, so the farm managers haven't had to do much office work for the past year except produce the CSA newsletter and answer questions. Cristin maintains the CSA member database, waitlist, and finance records. She handles all financial transactions, receipts, renewal reminders and invitations, and fields questions from members and prospective members. She also often staffs the table at CSA distribution and pitches in around the farm. She was preceded by an undergraduate student, Gena Lynn, another brilliant office manager, who fine-tuned all our databases, created templates of all our communications documents, and created a "secretary's manual" so someone like Cristin could step in and start working.

In the summer, three full-time interns do most of the work to keep the farm and CSA running. In the school year, 6-10 undergraduate students work 6-10 hours per week to keep the farm and CSA running. The farm usually has a volunteer core of 4-6 dedicated volunteers and dozens more occasional volunteers. More volunteers pitch in during the school year than summer, and more during the first half of fall semester than any other time of year.

This year the farm has just over 50 CSA members. Our members are about half MSU staff and faculty, just over a quarter students, and just under a quarter non-MSU community members. The CSA members are responsible primarily for financially supporting the farm in the form of share fees. Several of the members come to volunteer at the farm on work party days or at their convenience. There is also a Core Group of CSA members, started in the spring of 2005, whose primary functions are to serve as liaison between farm leadership and CSA membership, to organize work parties and

social events for members and farm friends, and to help with long term visioning, planning, and budgeting. The core group is just starting to find its voice in the overall farm system, but I think it's a great opportunity for members to participate in decision-making and contribute more diverse perspectives to the farm planning. I wish the farm as an organization had had a better understanding of the potential for the CSA and the role of a core group from the beginning (pre-production years); it could have saved us substantial work in organizing the business and communication ends of the CSA, and provided more stability in the form of non-student participation in the farm organization.

A central group of people in the development of the student farm are the club members. The Student Organic Farm Initiative was a club borne out of the Michigan State Sustainable Agriculture Network, or MSAN (see "History" section on the farm web page). Currently, the two clubs have re-merged as the Ecological Food and Farming Stewardship, or EFFS. The club members have, in the past, served as the core of workers who make the farm run, whether volunteer or paid employees. Since it started as a club project, there was initially no difference between club and farm activities; starting the farm and the CSA was the mission of the club, and a few committed individuals got paid from John's research funds to work regular hours constructing greenhouses, preparing beds for planting, etc, but the majority of the work was done in either massive weekend volunteer work parties or club members trickling out to the farm after hours to chip away at the project of creating the physical farm. Since the club "achieved" its mission of creating a working farm, it has had to redefine itself and its goals, and recently the day-to-day operations on the farm have taken a back seat to speaker series, field trips, and discussions around sustainable agriculture. Some of the farm workers are also club

members, but there is less and less overlap as the semesters have passed and the farm has taken on a life of its own.

The last group of people that have played key roles at the farm are the MSU staff and faculty, besides our farm advisors. Early in the history of the SOFI, John recruited a group of 20 faculty members who supported the SOF and who agreed to sit on the "SOF Advisors" group, or the "SOFA." Dr. Mike Hamm, C.S. Mott Chair of Sustainable Agriculture at MSU and former faculty advisor to the Cook College Student Organic Farm at Rutgers, is the co-P.I. on the USDA Higher Education Challenge Grant. Mike has yet to be tapped for an active advisory role (our mistake!). Drs. Sieglinde Snappe, Mathieu Ngouajio and their technicians have generously provided advice for specific cropping systems. Dr. Eric Hanson and his fruit production class in 2002 planted what is to date our only perennial fruit planting, and Dr. Hanson has offered to be a resource for future fruit plantings. Dr. George Bird donated on indefinite loan an Allis Chalmers G cultivating tractor, the organic apple orchard at the Clarksville, MI, research station donated, also on indefinite loan, a Massey Ferguson tractor, and so many others have offered to help; we just haven't been able to take all of them up on it yet. Bill Chase and Gary Winchell are responsible for the overall operation and maintenance, respectively, of the Hort Farm. They have been invaluable in providing heavy tractor work, lending trucks, tractors, equipment and tools, sustaining wear and tear, to say the least, on their borrowed equipment, maintenance and help in locating parts and supplies for our own equipment, training and advice, and supplying an uncanny assortment of canned goods to our cuisine.

The following section is a documentation of the evolution of the SOF farm and organization since January, 2003, mainly from a CSA managerial standpoint. It lays out our resources and relationships, and the decisions we've made. I think it will be particularly interesting for other student farms starting up or improving their organization, to learn the finer points of what we've done and learned. In the following chapter I address our reflections, concerns, and remaining questions, and make recommendations for next steps. Finally, I attempt to distill those experiences into recommendations for new or developing student farms, particularly with year-round CSA.

2. Phase I: 1999-2002

In 1999, a group of undergraduate and graduate students, faculty from soil science, anthropology, and horticulture, farmers, and local community members came together to vision and plan a student-run farm at MSU. During those early years, visions, ideas, and people changed with every meeting. Ideas ranged from a student garden on campus to a major research program to a market and wholesale farm. Participation and focus fluctuated, and an early mission statement developed in fits and starts (Murray, 2000), but a site was not secured until 2002. Students researched and compiled information on other student farms in existence at that time, and made initial contact with faculty and students involved in those farms, with the intention of continued relationships.

Thanks to the efforts of horticulture undergraduates Seth Murray and Lynn Rhodes, who, with assistance from Laurie Thorp, initiated a proposal to the Kellogg Food

and Society program, the $95,000 Kellogg grant was awarded to continue and expand John's winter salad production research at the Horticulture Teaching and Research Center and to finance farm development and operation for its first three years.

Taking stock: when I came on board in January, 2003, we had these resources:

- Six acres, five of which had been limed and planted in sorghum x sudangrass (2001) and rye (2002)
- Four useable unheated hoophouses, and a fifth constructed but not yet covered with plastic film. These hoophouses had been constructed under John's guidance, mainly by student labor in weekend work parties during the summer and fall prior.
- One heated greenhouse available to use.
- An office on campus with a desk and a bookshelf full of agriculture books
- Access to heated greenhouse space on campus
- Access to greenhouse supplies (potting media, plug trays, etc)
- Plastic harvest bins
- Personal vehicles of the students involved.

A one-credit course on developing a CSA was offered spring semester 2003, partly as a way for students involved in the farm to get credit for all the work they were already doing, and had to do that semester to prepare for the first CSA session, which started in May of that year. The decision had been made to run the farm as a CSA, but we had no business prospectus or development plan (beyond expanding membership). The budget had been constructed for the grant proposal to Kellogg, and as such included costs of construction materials, and estimates of equipment and supplies costs and

estimates of labor costs. While materials and supplies were generously provided for, we found over the past two and a half years that the labor costs had been almost grossly underestimated.

When I use the word "we" I'm referring to the farm as an organization of people: faculty advisors, graduate students, research technicians, undergraduate student employees and volunteers, and CSA members. The hard work of individuals of course has made these group accomplishments possible, and whenever possible, I have attempted to give credit to individuals' contributions. The truly amazing emergent changes are to me, however, a function of the dynamic and co-creative group process and collaboration. This is our village coming together, whether by design or default, to "grow the salad."

The term "student farmers," refers to the student workers who have literally built this place from the ground up. Most of them do not come from farming backgrounds or have any experience working on farms. Some are paid workers; some are volunteers. In the first year, student farmers were mostly SOF club members who came out at odd hours to help build greenhouses or plant. These were the folks who started or built the organization, whose passion for the farm brought it into being. Their personal investment in creating and maintaining the farm made the first year possible. If our only goal had been to provide a space for students to try their hands at growing things, the club model might suffice for labor. As I started to realize the scope and weight of all that we'd undertaken, it became obvious that a more structured work force was necessary. Most students who work as farm employees now have gone through a hiring process, and some relate to the farm more as a job than as a passion, but it's always a learning experience.

An entire iteration of student farmers has now come and gone: the last original student farmer cohort (from the pre-CSA days) graduated in the summer of 2004. We are clearly in the second phase of existence-- still building the aircraft, but already at flying altitude and moving at top speed.

3. Phase II: 2003-2005.

This is a list of our accomplishments thus far. Each is explained in detail in the following sections:

- Developed a physical farm with some infrastructure.
- Developed a farm plan and compiled records necessary for organic certification
- Developed a rudimentary understanding of winter production of diverse vegetable and herb crops in unheated hoophouses in Michigan, and of winter CSA operation
- Established a functional 50+ member CSA with a 48-week season
- Established a summer full-time student internship program and supporting materials (manual) for the internship and school-year
- Developed farm visit and tour protocols for classes and groups

1) Building the physical farm including some infrastructure:

The Student Organic Farm is a physical place, not just an organization. This section describes the land, structures, and equipment that make up the physical farm.

The Land. The farm is approximately 10 acres (400' x 1200'), seven of which are tillable, on the western edge of the MSU Horticulture Teaching and Research Center ("Hort Farm"). The Hort Farm is located on the southern edge of MSU's campus, about

four miles south of central campus on College Road, a two-lane public road that splits the approximately 160-acre Hort Farm in half, on the east and west sides of the road, respectively. The University purchased what is now the Hort Farm in the 1960's to expand the research farm area. It has been reported that people familiar with the farm were aware that no farmer had ever made a good living there, due to the heavy clay soil.

The SOF is bounded to the west and to the north edge by a beech-sugar maple woodlot and fruit trees. To the east are Hort Farm fruit trees, and to the west some fruit trees and some vegetable research fields, all non-organic (see map in Appendix (x). The area that is now the SOF was planted with fruit trees in the mid 1960's and remained so until 2000 when the first trees were removed. The primary research in the orchards was testing herbicides and pesticides. The former aisles were very compacted from repeated tractor traffic. During the summer of 2000, the first cleared areas were used for Round-Up Ready soybeans. The last fertilizer was applied in 2001. During the summer of 2001, John worked with the Hort Farm staff to start soil building by planting sorghum x sudangrass. Additional trees were pulled in 2001 and 2002, and followed with rye or other cover crops.

Structures. The farm includes

- five unheated hoophouses (9000 sq feet total)
- two heated greenhouses, about (4000 sq feet total)
- currently approximately six acres of fields in production. (see map, Appendix x).

The first (southernmost) two 20' x 96' hoophouses, covered with a single layer of 6 mil greenhouse polyethylene film, were originally built in August, 2001. The third house, also 20' x 96', was built in the summer and fall of 2002 and covered in a double

inflated layer of 6 mil greenhouse poly. The fourth house is 30' x 96', also built in the fall of 2002, covered in a double inflated layer of 6 mil greenhouse poly. This largest house is from Ledgewood Farms in New Hampshire, manufactured by Ed Person and used widely on farms in the northeast US. See Appendix B for diagrams of the layout of the interior of each of the four unheated production houses. The twenty-foot wide design was selected originally based on perceived lower cost and the need for ventilation from the sides. We have since learned that 30' wide is better than 20' for winter production, as it has a smaller surface to volume ratio, and therefore retains heat better, a benefit in the winter.

The university provided about 40 trucks of fill from a building project on campus which was used to make a work area and storage "pad," upon half of which is our "resource pile" and on the other half stands the "work house." The last house is 30' x 50', also a Ledgewood house, and double inflated poly-covered. All the houses have louvered "butterfly" vents above the front and back doors, or, where there is no back door, in the top of the back endwall. They all have roll-up sides for cross-ventilation in late spring, summer, and early fall. These houses were constructed using methods described in "Building a Hoophouse" (Byczynski, 2003, pg. 43). We currently grow directly in the ground in the first four houses.

The last house is used as a "work house," or tool and supply storage area, meeting area, and a hardening-off spot for transplants. The students have constructed a useable "kitchen" in the workhouse with a dorm fridge, propane range, scrap lumber and cinder block shelves, a coffee maker and toaster oven, and various extension cords, and fabulous (and creative) farm lunches have been known to come from the farm kitchen. Inside the

workhouse (besides tool storage and benches for hardening off transplants) are three picnic tables where staff, classes, and tour groups meet, a bookshelf with a few reference books and manuals, shelves and hooks for personal items and clothing, extra rain gear, a 3’ x 6’ chalkboard, donated by a graduate student farm supporter, two dry erase boards for weekly work lists and other communication, a four-month laminated wall calendar, all materials for documentation (tractor work, planting, harvesting, etc), a desk where we keep hard copies of crop plans, field diagrams, organic certification records, equipment manuals, calendars, and office supplies, and the farm “log,” book.

The back, or west, end of the work house has been turned into a makeshift packing shed, designed and constructed by student farmers. The whole house is covered with shade cloth from late spring through early fall, and the shade cloth extends approximately 8 feet beyond the west end of the house , where it is supported on a frame constructed of scrap 4 x 4 lumber and conduit pipe, about 8 feet off the ground at the far edge. The ground beneath is gravel, with a 6” perforated drainage tile approximately 5 feet from the edge of the house, just under the surface. This area houses a root-washing table, built from an old greenhouse bench base with a top made from orange snow fencing secured to a frame of scrap lumber, a weigh station (old slate lab benchtop supported on cinder blocks, with a scale and clipboard on top), and dunk station (also slate lab benchtops on cinderblocks, with a rubber 50-gal stock watering tub and various plastic tubs). A hose runs from the riser outside of the work house back to the wash/pack area.

All houses have electricity and a frost free water source. The 2” water line runs about 800’ and then is reduced to a 1.5” line for the last 200’ and is buried at least 3’

deep. Standard frost free hydrants (1" pipe) are located at the east end of each house by the door. Water lines were installed as part of John's original research program with hydrants for 4 houses even though only 2 were built initially. After filling of the work pad area, 2 additional hydrants were added, for a total of six. The major cost in our case was not the materials (less than $1000) but the labor and equipment for digging the trenches (over $2500). Initial cost of burying electric line was low (less than $250) compared to the cost of placing weather sealed and GFI receptacles in each house. Due to safety concerns at the Hort Farm, the University Physical Plant was required to do the installation of receptacles and hook ups, but luckily the Hort Farm also covered this cost.(over $1000 to hook up 5 receptacles in 5 houses).

The third house has two geothermal air heating systems in place as demonstrations. One system, currently operating, is a simple heat exchange system: air from inside the house is drawn down into the ground via a 6" solid PVC riser, in the center of the house, which "T's" down into another 6" solid PVC pipe which runs the length of the house below the frost line (7' under – the depth the borrowed trencher could reach). The air is drawn back up and out at or just above plant level via two vertical outlet pipes connected to the underground pipe, one at each end of the house. This is accomplished with small fans (readily available for accelerating air in heating ducts) mounted in the ends of the outlet pipe. The whole thing looks like a giant capital letter "E" laid on its back and buried half way. In the winter, the air temperature underground is a relatively steady 45-50 F and at night, or on cloudy days, the air that has traveled underground is approximately 45F when leaving the pipe, warmer than the ambient air. This first system runs along the south half of the house; in the winter the two halves are

separated by “mini tunnels” within the house: frames are erected over the beds, about 3’ high, and covered with greenhouse plastic, creating two separate microclimates within the house with a central aisle between them. What we have learned is that the basic concept is good, but many more – probably 6 total -- pipes would be necessary to have the desired impact. Geothermal air tubes are a significant investment but may have a reasonable payback time. There still needs to be more research and thought put into the relative merits of heating the air or the soil.

The other system is based on ideas from a grower in Colorado and uses buried 4” flexible plastic drain tiles for heat exchange and condensation at different dewpoints of air at different temperatures, drawn through pipes at two different depths underground. The idea is to heat the ground mass during the summer and carry that heat into the fall. This system has never been completed; we’ve never used it and have no immediate plans to do so.

The fourth house has a hot water soil-heating system in place, though we’ve never used it for any long period of time. This system consists of a series of closed-loop 1” flexible poly tubing 12-15 ” under ground. There are two lengths of tubing, or one closed loop (an elongated oval) per bed, in each of four beds, all on the north half of the house. The tubes run east-west, along the lengths of the beds (90’ long, so 180’ of tubing per bed). They are connected at the east end to an on-demand domestic propane water heater, with shut-off valves at each bed.

There are two main problems with this system. First, in an unheated house, if the system is not heating, the water in the lines above the ground will freeze. Recreational vehicle anti-freeze diluted with water (60/40) did not prevent freezing and possibly

reduced the capacity or effectiveness of the circulation pump. The other problem – more obvious in hindsight than foresight – is that ground below is a huge heat sink; the amount of heat energy carried in the water in those four 180' tubes is too small to overcome the effect of the heat sink of the surrounding earth. In another research greenhouse with soil heat, the beds were built on top of Styrofoam insulation board so the ground as a heat sink was not a major issue. For researchers interested in soil heat in winter greenhouses, reducing the effects of the surrounding ground as a heat sink is an area for future research..

Steve Moore, a winter farmer in Pennsylvania, mitigates the loss of greenhouse soil heat to outside ground by burying foam insulation around the perimeter of his houses, effectively trapping much of the accumulated solar heat in the ground (Byczynski, 2003). We've discussed adopting this method in the future also.

Near the front (east) of the Hort farm, disjunct from the rest of the SOF, we have the use of two heated greenhouse spaces. One is a 20' x 96' gravel-floored hoop structure with double-inflated polyethylene covering. Inside this house we grow in 5' x 5' raised beds, constructed of 2 x 12" lumber, lined with landscape fabric, and in half the beds, plastic liners, and filled with composted soil. There are two separate bed systems in this house, the east and west halves, each with 17 beds. Half the beds in that house (the west side) have a subsurface irrigation system: 4" perforated drainage tile was laid in a circle in the bottom of each bed before soil was added. A short connecter piece of tile extends vertically above the level of the soil in each bed, and we hand-water, using a watering wand on a hose, into that vertical pipe, until the circular base of tile is partially full of water, which then seeps into the soil through the perforations. In winter, this is

advantageous to avoid wetting plant leaf surfaces and causing mold. John and Melissa uses these west beds for the "control" plots in their baby leaf salad greens research; the house is heated, and temperature can be controlled from the air or from the sub-surface hot water heating system. The other half of the beds (east side) are surface watered; they have no special irrigation system. Both halves of the house have sub-surface hot water heating systems, in addition to a standard forced air (Modine) greenhouse unit heater. Each side has Biotherm tubing under all beds, through which can be circulated hot water from a natural gas domestic hot water heater. Each side has its own heater, which can then be set at different temperatures to compare plant growth at different soil temperatures.

The other heated house, the "range house" is one wing of a range of heated greenhouses. They are both technically under the jurisdiction of the MSU Plant Science Research Greenhouses, managed by the Michigan Agricultural Experiment Station (MAES). As such, the "range house" wings are typically high security, locked at all times unless someone is working inside, and accessible only with permission and a key. Inside the range house we have a potting bench with all supplies, a cement mixer for mixing potting media, and bulk supplies of potting media components (peat, coconut coir, vermiculite, and farm-made compost), a germination chamber, an automatic seeder, bench space for growing transplants and potted plants, and a compost demonstration area for class visits. The most recent addition (still under construction) is an aquaponics demonstration a graduate student is constructing for a bluegill and lettuce demonstration production system.

The potting bench, mixer, seeder, and some of the pots and plug trays were all supplies from John's former greenhouse research projects on campus, and donated by John for the farm's use. The potting mix components (peat, vermiculite and perlite) are either donated by supply companies or purchased . The germination chamber was constructed by student farmers. It consists of a four-legged wooden rack and holds up to 48 plug trays on six levels. It sits on top of a cinder block base, with a small electric baseboard heater below it, on the cinder blocks. It is encased in greenhouse plastic on the top and sides. The front plastic is removable to access the trays inside. There is a thermostat attached to the heater, which we keep set at 75 F for germinating most seeds, particularly in winter and early spring. The purpose of the germination chamber is to only heat a small area of the greenhouse for the first stage of germination. In sunny weather, we often put a bucket of water inside the chamber, on the cinder blocks, to help maintain humidity.

The compost demonstration area consists of pallets lashed together to make three adjacent bays, each approximately one cubic yard. Visiting classes and tours have built, turned, observed, and monitored compost piles in this area. We plan, however, to remove this indoor compost area since turning compost and breathing the associated mold and fungal spores in the closed environment may be pose a health hazard.

We have a small storage cage inside a larger Hort Farm pole barn, where we store irrigation supplies, pea trellis, crates and bins, and frost fabric when not in use, as well as hang garlic and flowers to dry. We use this barn space to store cucumbers between harvest and distribution, since they are subject to chilling injury at temps below (50 F), and tomatoes, since they lose flavor and quality when stored below 50 F (USDA hb 66),

and our walk-in cooler is set to 40 F. The walk-in cooler is perhaps the best subsidy we could receive through the university. There are six walk-in coolers, approximately 30' x 15', at the Hort Farm, and we have access to two of them. One is normally kept at 40 F, with unregulated RH which ends up relatively humid (between 50 and 80% RH) and the other at 50 F/70% RH. See "48-Week CSA" section for description of the coolers' roles in CSA crop storage.

Since our CSA program is set up for members to pick up shares at the farm, rather than at a remote location, the CSA requires a safe, welcoming place for share pick-up. We use the break room at the Hort Farm, which is a 30' x 40' room inside the main Hort Farm building. It is conveniently located across a main garage area from our walk-in cooler, and it contains a large meeting table, chairs, and countertops, which we use for CSA distribution. Prior to our use, it was used for weighing samples from Hort Farm research projects, for lunch and breaks, and occasional meetings or worker training gatherings. The room is accessible through the main open garage area in the center of the building, or though an outside door.

We recently set up an office at the Hort Farm, in a corner of the Hort Farm Conference Room. Currently the "office" is a desk, chair, filing cabinet, computer, printer, and digital camera. There is currently no internet access at the farm. We keep a cellular phone, which was purchased by selling additional CSA shares (above the 50 projected) last summer at the SOF, plugged in inside the work house, as our business phone. Until this spring when we set up the farm office, we were using (and still do primarily use) an office on campus, in the Plant and Soil Science Building. In that office are a computer with a printer and internet access, desks and chairs and mailing supplies

for the CSA secretary, which all come from the Horticulture department. There we store all hard copies of farm documentation (crop plans, harvest records, etc), conduct all on-line farm-related work, and manage the business end of the CSA. Student farmers also often use their home computers for on-line farm-related work.

Tools and equipment. Hand tools include a wheel hoe, several stirrup or scuffle hoes, collinear hoes, rakes, shovels, digging forks, pitchforks, hand weeders and trowels, a variety of harvest knives and clippers, a small collection of "toolbox tools" (i.e. hammers, measuring tapes, screwdrivers, hand saws, etc), and buckets, bins, and crates for harvesting and storage. Some hand tools were donated by a former student farmer's family when they sold their farm. The 5-gal plastic buckets were donated from the MSU Dairy Store; some of the plastic harvest bins were left over from an old research project of John's, some are bulb crates purchased or borrowed from the Hort Farm, and wooden apple crates were donated by a former student farmer from her family's farm. Everything else was purchased with grant money. There are two walk-behind seeders: a single-gang Earthway seeder, and a four-row Johnny's Pinpoint Seeder (see descriptions in Johnny's Selected Seeds catalog). We're presently investigating purchasing a new model of six-row precision, or pinpoint, seeder from Johnny's Selected Seeds. We have two large garden carts, two wheelbarrows, a Troybilt walk-behind tiller with attachments, and a 2-cycle gas-powered weed whip. For tunnel bed preparation, we use broadforks, three-tined claws, and 30" rakes designed by Eliot Coleman specifically for greenhouse bed prep (see descriptions in Coleman, 1989 pp 84-87, and Johnny's Selected Seeds catalog).

We received, just this spring, two "gifts" of indefinite tractor loans. One is a Massey Ferguson which we sometimes use for tilling, spreading, and wagon-pulling; the

other is an Allis Chalmers G, the cultivating tractor of choice of many small-scale, organic vegetable farms. The G came to us in need of work, but will serve us well when it's up and running. There is currently no good covered storage space for our tractors. We also have intermittent use of John's personal manure spreader from home when needed and available.

From the Hort Farm, we have access to additional tractors and implements. We regularly borrow their John Deere 900, an off-set cultivating tractor, though only occasionally for cultivating (weeding)– mostly for tilling with their four-foot Land Pride rotary tiller. We also regularly use their JD 2155 for tilling, disking, or harrowing. We occasionally borrow the Kubota L2650 for light field work, and the JD 5520with the bucket or forks attachments for turning compost piles or moving compost or round bales. For primary tillage, or large disking jobs, Gary, Bill, or one of their employees will use the JD 6410 with their 6' Imants rotary spader, the 16' disk, the 8' Perfecta field cultivator, or, in rare circumstances like breaking new ground, the 5-bottom moldboard plow. We also borrow the Hort Farm's riding lawnmower, BCS tiller/mower, brush hog, and flat bed wagons, as well as extra hand tools and wheelbarrows for large work parties. In the past, we have also used the one-row potato digger from an MSU potato researcher for potato harvest, when it's not done by hand by volunteer groups.

Our irrigation systems are lawn sprinklers (for early in the season, before we get the drip system set up, or for spot surface-watering) and an extensive drip tape system. Each field has its own tailored system, depending on the length and number of beds, but basically they all involve a way to get water from a source (risers, connected underground to a well at the front of the Hort Farm) to the plants in the beds. We usually

connect a heavy-duty garden hose to a riser and run it to the nearest corner of a field. The hose feeds into a header system, which is either 1.5" semi-rigid black poly tubing, or 2" blue layflat hose (See Trickl-eez catalog for product descriptions). Fields are divided into four sections which can be watered all at once (which is not so good for the larger fields; pressure runs out before water reaches the far ends of the tapes) or section by section, depending on crop needs. Each section has its own "sub-header," made of 2" blue lay-flat, which is connected, with a ball valve, to the main header. The T-tapes are connected to the "sub-headers" with "Tape-Loc" fittings (see Trickleez catalog).

2) Crop planning and organic certification:

Our crop and farm plans have evolved within the context of certified organic farming practices. Organic certification was important to some key people early in the development process, as a tool for communicating about what we do. The rationale was that the USDA's National Organic Program (NOP) describes specific allowable farm practices, and that if we wanted to demonstrate organic farming, the NOP's standards could serve as a common language between the SOF and its audience: insofar as the farm's agricultural practices are within the bounds of the national organic standards, we don't have to interpret that aspect of the farm's operations. Legal organic certification can serve as an important communication tool between producers and consumers, as well: it provides a minimum level of confidence on the part of the consumer in the ecological soundness of the farm's practices. This is especially important for farms selling wholesale in stores or restaurants; the store or restaurant can only advertise products as "organic," and thus charge commensurate prices, if the farm from which they

come is inspected and legally certified organic. Thereby, the farm can charge prices commensurate with the usually higher economic cost of organic production. Certification is hardly necessary for most CSA farms because of the direct relationship between producers and consumers (and the opportunity to witness first hand the farm's agricultural practices and ask questions of farmers in person). However, the situation of the SOF at a public demonstration and research institution dictates a level of commonly accepted definitions, in this case "organic."

The SOF is inspected and certified yearly by the Organic Growers of Michigan, using the standards set forth in the NOP. We supply the same information and submit to the same inspection as any diversified vegetable farm seeking certification. The standards are described on the USDA's web site (http://www.ams.usda.gov/nop/indexIE.htm), and a synopsis can be found in Sustainable Systems Design (SSD) (2001). A sample Farm Plan and certification application form as required by OGM can be found on their web site at (www.michiganorganic.org). Our record keeping complies with and surpasses that required by the NOP, because result of the research initiative on the farm. We document everything that happens on the farm, from compost turning and applications, to air and soil temperature, to planting and harvesting, to visits by other farmers. See the Intern Manual in Appendix C for sample data collection forms. In addition to the whole farm plan form required by OGM, the SOF uses a crop planning spreadsheet developed by Jeremy and me for both planning and generating planting records (see sample crop planning spreadsheets, Appendix E).

The creation of the first iteration of the farm plan, as required by OGM, serves as a good example of the farm and undergraduate students in a mutually beneficial

relationship. Lynn Rhodes, with help from John Biernbaum and Melissa Timm-Cook, researched and compiled all the information and necessary record-keeping documents for the farm, as an upper-level independent study course. Her own interest in organic standards and farm certification served as a vehicle for her to receive course credit in exchange for providing an invaluable service to the farm in its development phase.

3) Winter production of diverse vegetable and herb crops in unheated hoophouses in Michigan, and winter CSA operation:

This section could be a masters' thesis in itself; indeed when I started my program, that was the original idea for my thesis: to design and implement planting trials over a variety of cool-season crops, akin to John and Melissa's salad greens trials the previous years. We soon realized that starting and running a student farm and CSA was already more than a graduate student with no farm management experience could handle, and that also designing and carrying out controlled planting experiments of any quality that could generate reliable data was unrealistic. Melissa, however, stepped up in her capacity as research technician and, as John has said, the "quiet hero of the farm," to direct the winter planting and harvest protocol and data collection. What we've ended up with is a system that any production-oriented (that is, for-profit) farm could never employ, and that a field ecologist or research scientist would flee from, but which does the job of serving our multiple needs of CSA crop production, facilitating teaching about winter production, and generating useful data.

By "winter production" I'm referring to the ability to generate fresh and stored, but particularly fresh, food through what is normally the off-season for farmers in our

area. Root cellaring, in-field root mulching and storage, "clamps" (temporary insulated and covered storage pits in the field), and of course canning, drying, and freezing have all been utilized as food storage methods since well before greenhouses or the industrialization of our food system (Bubell, 1979, and Aubert, 1999). These methods extend the *eating* season, but not the production season. Some commonly used techniques for production season extension include planting cold-tolerant crops, covering with plastic or floating row-cover in the field, using cold frames, using unheated hoophouses or high tunnels, and of course, using heated greenhouses. We are interested in all of them, but particularly the unheated hoophouses. They are relatively low-energy and low-cost compared to heated greenhouses, simple to build and use, and provide the potential for the shortest time to recover investment costs (Biernbaum et al. 2004).

Farmers in Europe and the northeastern U.S. commonly use unheated hoophouses to extend the normal growing season (Coleman, 1992), but it's still relatively new to Michigan farmers. We hoped to develop and understand our winter hoophouse production system well enough to serve as a model for students and small-scale farmers in our area. So far we've developed a system that works sufficiently for the scale and scope of our operation, but has lots of room for improvements in design and efficiency. Our collective understanding of the system is sufficient to keep our CSA running, teach new student farmers how we do it, and conduct outreach programs in the form of workshops, guest lectures, and tours. With time and experience, that understanding will only grow richer and more informed.

It's worth digressing for a moment here to tell the story of Persephone, daughter of Demeter and Zeus in ancient Greek mythology. Hades, ruler of the netherworld, was

in love with Persephone. He allegedly "tricked" her into eating a pomegranate seed while in the underworld, which effectively consummated their relationship and made her his wife. Demeter and Zeus managed to rescue their daughter, but as part of the bargain they made with Hades, Persephone had to spend a third of each year in the netherworld. This is the time when Demeter, goddess of agriculture and fertility, goes into grievous mourning and nothing grows. The Persephone time is when "cold frame crops reign supreme" (Coleman, 1996),

Four Key Elements. CSA farmers, market farmers, wholesalers, home gardeners, and teaching institutes will have different twists on the basic theme of winter production, but there is a common theme The **four key elements** to winter crop production are "the right *plants* (cold tolerant), planted at the right *time* (before the days get too short and temperatures too low), using *multiple harvest* or cut-and-come-again harvesting, and *crop protection* from wind and excess moisture. It is all about understanding the system to allow local food all winter long" (Biernbaum, quoted in Olender, 2005, italics mine). For practical consideration, we think of the common winter tunnel-grown *plants* in groupings based on growth habit, edible part, and cold tolerance. Our groupings are *root* crops (carrots, turnips, beets, radishes, scallions), *head vegetables* (most Asian greens, Chinese cabbage, radicchio, celery, lettuce), *leafy greens* (harvested loose or bunched, for cooking – kale, chard, beet greens, some Asian greens, e.g. mizuna and mibuna, spinach, and herbs like parsley, dill, and cilantro get thrown in this category), and *baby leaf salad greens*(baby sized leaves of lettuce, spinach, mache, beet greens, mizuna, kale, sorrel, cress, mustard, and endive, for example). Extensive information about all aspects of salad greens production and some information on the

other crop groups can be found in Biernbaum et al. (2004). In short, the baby salad greens and root vegetables tend to be most hardy and resilient, followed by the leafy greens, and the head vegetables tend to be most cold-sensitive.

Timing of planting for winter harvest is critical and probably not intuitive to anyone who has ever gardened in the traditional season. Since days are getting shorter, nights are getting colder, and life is just generally preparing for what is normally the hibernation and stasis period of the year, plants behave differently than in the spring. Up to a point, the later a crop is planted, the longer the time from planting to maturity. As of the second week of November (at our latitude, ~41), the average daily temperatures (ADT) have become too low and the total amount of solar radiation or the daily light integral (DLI) become too small for plants to photosynthesize enough to produce significant growth. The primary limiting factor in some sense is temperature: we've observed the same crops in the heated greenhouse growing somewhat during the winter. However, in an unheated greenhouse, the DLI also influences both day and particularly night temperature due to radiant heat from the soil. For winter farmers, this means that whatever stage of growth a plant reaches by mid to late November is where it will mostly remain, "hanging out" until late January or early February, when ADT and DLI increase enough for crop growth.

Crops need to be planted early enough to reach maturity or near-maturity before growth stalls in November, so they can be harvested as needed through the dark period and early spring. If plants are planted too late, that is without time to reach maturity or near-maturity before mid-November, they will "hang out" at that immature stage all winter. Crops vary in their response to the over-wintering experience. Biennials, if left

in the ground much beyond February, will take a cue from the lengthening days and start to flower. Annuals, if subjected to extreme temperature fluctuations or water stress, as are often present in the very early spring hoophouse environment, will realize that life isn't going quite as they'd been led to expect, and will bolt or die, depending on the crop and stress level. So it's advised to plant early enough for crops to be harvestable by the end of February.

Some crops, like head lettuce and celery, sustain significant damage from sub-freezing temperatures inside the tunnels, and are best harvested before the end of December, when consistent freezing night temps become the norm in the tunnels. We try to harvest all of our "head" crops from the tunnels during our fall CSA session, which ends mid-December. For January and February shares, we plant head crops, at around the same time, in beds in the heated house (air temp heated to just above freezing). We have only two winters' experience growing head crops, compared to four growing baby salad greens (two CSA winters plus Melissa and John's salad greens production the previous two winters). This past winter (2004-05), head crops left in unheated houses over winter maintained harvestable quality into early January, but lost quality quickly in late January.

Obviously (or maybe not), beds need to be prepared ahead of time to make sure plants can go in the ground early enough to grow to maturity before Persephone sets in, in early November. Our first fall planting (for winter harvest), we had been using the houses for summer production, also. The week we'd wanted to start planting for winter came up, and we still had houses full of plants. Cleaning out a greenhouse and re-prepping beds for planting takes time, and since I barely had our outdoor systems clear in

my head, the job of adding an additional planning, planting, and management cycle (i.e. "farming the back side of the calendar" –Coleman, 1998) had slipped through the cracks. We rallied everyone we know to come rip out plants and prepare beds, but the direct seeded crops and transplants (what there were of them by then – another detail partially overlooked!) all went in later than optimal (early August for the first plantings through mid October for the last). If not for encouragement and reminders from John and Susan Houghton, we might never have planted even as early as we did. If not for Melissa stepping up to make sure seeding and planting happened, we might not have had much besides cabbage and potatoes for our members that winter. As always, it's a community project at the SOF.

This is how most of the learning has happened at the SOF (trial and error—not because of lack of information; guides to winter hoophouse production, while limited, do exist-- but from lack of organization, farm management experience and communication). Going into our second winter, Melissa, Emily, the undergraduate student farmers who had been through the first winter, and I all felt much more confident, having one season's experience under our collective belt. Over the past two years, we've been able to make and record our observations of what works well and what doesn't, communicate with other farmers doing similar work and compare notes, and attend workshops on hoophouse production.

Multiple harvest crops are the backbone of winter production. While one-shot crops like the head vegetables and root crops are wonderful for diversity and nutrition, the salad and leafy green crops are most important (and most lucrative, for anything besides a CSA) for continued winter production. Mature bunching greens like kale,

chard, and, as we've recently discovered, komatsuna (an Asian green related to pac choi) perform well under winter conditions. If planted early enough (July or August) they will establish a mature root system early in fall, and we can harvest two to three times before Persephone sets in and regrowth stops. We try to make the last fall harvest early enough so they can regrow plenty of mature leaves before growth stops in early November. We've found that mature crops planted and established early (by late August) are more productive than younger plants entering November, even with an apparently equal above-ground biomass. As the dark time of year approaches, plant growth slows, but the more well established plants seem to regrow faster after harvest. Also, even though for planning purposes, it's safe to assume growth essentially stops in the winter, during the odd December or January sunny spell, and early in February, plants will grow a little. And, in my experience, the larger a plant's root systems, the more growth during these opportunistic times. This requires healthy plants, of course, and healthy plants require healthy soil and proper watering. We have tried overwintering chard that was planted in the tunnels in early spring, was continuously harvested through summer and fall, and left in place and covered with frost fabric or plastic for winter. While we got some good harvests from them, for practical purposes (height of frost fabric support frames, in this case), shorter crops are easier to manage in winter than extremely tall crops (> 3 ft).

Baby salad greens are perhaps the poster child of winter hoophouse farming. Everything about them is well suited to winter production: multiple harvests, high value, good cold tolerance, and more resilience to extreme environmental fluctuations than mature plants. Please see the section of the SOF Intern Manual called "Everything You Ever Wanted to Know About Baby Salad Greens (but were afraid to ask)" in Appendix C

for detailed information about planting dates, seeding rates, yield per square foot, cold and heat tolerance, and post-harvest handling. Through their research on baby leaf salad greens (BLSG) production, John and Melissa have generated an extensive body of data and experience on winter salad greens production, and the SOF, along with attendees at John's talks and conferences, has benefited greatly. As with large, leafy green crops, baby salad greens with established root systems will grow back more quickly than those newly seeded. We try to plant all of our winter salad beds in the houses by the end of September. This allows us at least one cutting and regrowth before growth essentially stops. In a pinch, we've planted mustard greens, or other fast-growing plants in the mustard family, as late as early November and still harvested them once in the winter (before March). We try to plant enough beds of salad greens to provide four harvests between mid-November and mid-February, from a single cutting from each bed since there's little to no regrowth at that time. We often will harvest two or three times from a baby salad bed, then allow the plants to grow to "adolescent" or mature plants to harvest for non-salad greens. Allowing former salad beds to become leafy greens crops serves multiple purposes: gives leafy greens crops a head start with an established root system and saves seeds, labor and time.

Sample Winter Crop Planning Process: In our CSA, we like to provide some form of salad every week; we try to alternate between bagged baby greens and mature head lettuce (butterhead, romaine, oakleaf, etc.). There are eight weeks of CSA during Persephone (fall session ends mid-December; spring session starts mid-January); for four of those, members will receive head lettuce. For the other four, baby salad. We harvest an average of five shares' worth of baby salad per bed in the winter, and we have 50 CSA

shares. That means for each week we distribute salad mix, we need to harvest ten beds. If we plan for four weeks of salad mix in the shares, then we have to plant 40 beds of salad components before the end of September. After mid-February, salad beds will resume growth, and we'll take multiple cuttings.

For *crop protection*, the fourth key element of winter production, the hoophouses are the crops' first line of defense. The houses protect crops from physical damage from wind, hail, snow, and rain. They also mitigate the extremely cold temperatures in winter. Coleman (1996) has estimated that for every layer of protection between the crops and the outside environment, crops experience the equivalent of growing one gardening zone south of their actual location. In the hoophouses covered with double inflated poly, the plants benefit from one substantial layer of protection, effectively "moving" them one gardening zone south. In the winter, we add a second layer of protection, a floating row cover of spun-bonded polyester frost fabric, or a layer of greenhouse poly, supported with metal frames(conduit pipe for plastic or #9 wire for frost fabric), over the plants. We've observed that a larger area under this inner layer of protection provides better protection than a small area. The plants under frost fabric that spans 13 beds in a block, 12-18" above ground, seem to sustain less frost damage than under frost fabric that spans only two beds in a block. The plants under the greenhouse poly that spans 13 beds, supported four feet above ground, do even better. In the future we plan to build higher frames over larger areas, and use greenhouse poly whenever possible, for the inside protective layer.

4) Establishment of a functional 50+ member CSA with a 48-week season:

The creation and development of the Community Supported Agriculture (CSA) program has been my favorite personal achievement, and, together with the privilege of working with the student farmers, my greatest professional pleasure of the past 32 months. This section is the story of the evolution of the CSA as we know it today. It starts in January, 2003, after the land, grant money, personnel, and some infrastructure was established, and ends now (summer 2005).

My Experience with CSA. Before I describe the evolution of our CSA, some background about my previous CSA experience might be useful. My own experience with CSA started in 1995 when a friend apprenticed for the summer at the Community Farm of Ann Arbor (CFAA), the oldest CSA farm in Michigan. I visited the farm with her part way through the season. I met families who had been members since the farm started in the mid 1980's. I met young urban and suburban children who had grown up with the farm, the seasonality of food, the personal relationships with animals, plants, and humans, and the community of CSA members as *de rigeur* in their life. It was my first exposure to CSA, my first face-to-face encounter with local, organic farmers (other than at the farmers' market), and my first glimmer of the concept and potential of local food systems.

Two of the next four years my household had a share at the Community Farm, then the only CSA serving Ann Arbor . As a member of the farm, I enjoyed, among other delicacies, fresh greens weekly: kale, collard greens, Swiss chard, pac choi, beet greens, spinach, mizuna, arugula. While I was familiar with spinach, comfortable with chard, and dimly aware that beets had leaves, the amount and variety took me by surprise,

as most new CSA members can attest. During 1998 and 1999, I lived with some CFAA apprentices and had the fortunate opportunity to volunteer at the farm and truly learn the art of seasonal eating. In 1999, I moved to Massachusetts and helped out on a small CSA and market farm outside Boston for the tail end of the season while I started graduate school.

The following summer I spent my first full season working as an intern at Drumlin Farm in Lincoln, MA, a Massachusetts Audubon Society property maintained as a working and demonstration organic farm. We started a 30-member CSA that year in a unique collaboration with an inner-city urban shelter and farm project, to strengthen the urban-suburban food system connection and to complement the income from our two farmers' markets and on-farm stand. The learning curve my first full season was steep and full of surprises and pitfalls, but I realized I couldn't imagine doing anything else for a living. In Massachusetts I had the good fortune to join a community of small-scale, sustainable farmers of various stripes, and to visit some of the oldest CSA farms in the US. It was in Massachusetts that I started to understand the community-building potential and truly alternative business model of CSA: at its best, a truly mutually beneficial relationship among all participants, minimizing externalized costs. I finally felt like I had found an extant philosophy and livelihood that made sense to me. I left school, moved back to Michigan, and worked part time the following summer at Tantre Farm in Chelsea, MI, an organic 40-acre family farm, where I grew flowers and herbs for the farm, went to farmers' market every week, and helped with their first year of CSA, also. In 2002, I worked full time for Tantre, still growing flowers and herbs, but working alongside the farmer to do everything else, as well.

When I came to MSU, I'd had experience working on CSA farms, even helping to establish new CSA programs. I had never started a farm, nor taken primary responsibility for the operation of a CSA. In short, I had a lot to learn. Fortunately, in our first year of operation, there were four student farmers who had previous farming experience, including one with CSA experience. In the following paragraphs, I document the evolution of the MSU SOF CSA, from planning to its current incarnation of 50+ members, 48 weeks per year.

Membership logistics: size, price, distribution methods. In Spring, 2003, John offered a one-credit special topics course on CSA development. The class was intended to provide a dedicated learning and planning time for CSA; since we had committed to offering 25 shares, and the crops were in the ground, we needed to ensure that it would actually happen. Many of the students active in the SOFI enrolled in the class to get credit for what they were already doing. I participated in the class, partly as a student, partly as an assistant, partly as an observer. We used *Sharing the Harvest* (Henderson with Van En, 1999) as a textbook, and discussed all aspects of starting and running a CSA farm. Together, the class made decisions such as size and price of a share, session start and end dates, payment options, share pick-up sites and logistics, harvest and distribution day, and discussed production and planting, as well. We hosted guest speakers like Susan Houghton, farmer at Giving Tree Farm, and Dr. Laura Delind and Rosemary Edgar, former organizer and farmer, respectively, of a now-defunct member-driven CSA in Mason, MI. Students constructed sample cropping plans, irrigation plans, member recruitment strategies. Some of the students and club members had worked on farms before, but few had any CSA experience. Some students had some clear insight

into business management, and local food systems, however, and the discussions were usually lively. The SOF club was holding weekly meetings, and several students were working part time at the farm, and brainstorms and decisions happened in all three arenas, at all times of day and night. The class was intended to be an extension of the work already begun, and as such was fairly free-form and unplanned. Some of the students were disappointed in the lack of organization and planning that went into the class, and felt they would have been better served to continue to volunteer for the club, but pay for credits for more formalized learning opportunities.

Share size and distribution method were hot topics. We considered offering half shares and full shares, the sizes and prices of each, and the benefits and drawbacks. Besides the attraction of a simple system, the major factor in deciding *not* to offer half shares was reports from farmers in Laird (1995) that half shares required more work and organization than they returned in profitability. This is consistent with my own experience on CSA farms, although worth noting is that we were and are in a very different situation from most CSA farmers: as the students in the class observed, our preferred market, students, tend to live and prepare food in smaller household units than the average target CSA share size of four people (Henderson, 1999, Strochlich and Shelley, 2004).

We wanted to create as fool-proof a system as possible, and both experienced and inexperienced student farmers thought the additional degree of organization and record-keeping required by multiple share sizes was more than we wanted to take on the first year. Currently, many of the students and some of the non-students do split shares among two or more households. While we prudently invoked a principle of “the simpler

the better" to start, there is still much room for discussion of different share configurations, particularly as we gain more collective experience and organizational capability. Share size was designated to be enough to meet the weekly produce needs of four people, or "three vegetable lovers," or an average of 10-12 lbs per week, based on share sizes reported in Henderson (1999), Laird (1995), and my own CSA experience. Even in, or perhaps particularly in, a year-round CSA, that value is only an average, and not a weekly promise. In the spring, when greens, herbs, salad, and scallions prevail, share weights tend to be lower, whereas in late summer when tomatoes, melons, onions, and squash are in season, share weights can be double that predicted average. In the winter when cabbage, onions, potatoes, and other root vegetables are in abundance, the shares tend to be heavier, also. These arguments of course assumed that we had the ability to generate produce of a quality and volume consistent with the price on which we decided.

Share price was a big decision. One of the original goals of the student farm was to offer students the experience of working in a real farm setting and experience the challenges and pitfalls of production agriculture. With this in mind, we wanted to make the CSA a real and valuable entity in the MSU community and greater Lansing food system, and we wanted the price to reflect that intention. We also were very conscious of the potential to compete with other local farms. Since we were subsidized by a grant and the university, we did not want to underprice our shares and draw potential business away from other CSA farmers or create artificially low-priced, subsidized food. One of the worst mistakes a CSA farm can make is underpricing shares, thereby undervaluing their own and their colleagues' work, and perpetuating the myth of cheap food (Laird, 1995,

Henderson, 1999). In retrospect, the competition concern was unfounded. The market for CSA membership in the greater Lansing area is barely tapped, as our waitlist of >50 names can attest. In respect to the effort to debunk myths about food production costs, and to maintain if not elevate the perceived value of the work of farmers, I think our current price is fair.

However, since the farm is still dependent on inexperienced student labor and partly on student management, it may not be fair to our members to expect them to pay the going CSA rate. It does not reflect our experimental, educational, or transient nature, which of course introduce a level of unreliabiltiy and uncertainty beyond a working farm. We are of course asking our members to support something greater than vegetable production, and many join to support the educational mission of the farm. Perhaps strangely, this was not part of our initial considerations. Initially we considered $300 a fair price for a 16-week share, but after considering the going rates for CSA in Michigan, which at the time was $400-$900+ for 20-26 weeks, (based on conversations with CSA farmers), or about $20-$34 per week, we decided to price our 16-week shares at $350, which works out to $21.88 per week.

We decided to adopt a "buffet style" share distribution system. My experience with the buffet, and with the pre-boxed methods, led me to believe that if a farm has the space and ability to offer a buffet to members, it is preferable to the pre-boxed system. Not only does it save the farmers the work of filling, delivering, and retrieving boxes, it provides members the opportunity, in fact, the necessity to come to the farm and interact with the farmers and each other. We have discussed the potential to dig a root cellar back by the SOF proper, with space for CSA members to pick up their shares. We've also

talked about setting up distribution in the shade along the edge of the woodlot adjacent to the farm. However, we had an indoor space available to us, close to our walk-in cooler, and it was simpler to use that space, for now. The farm is close enough to campus that our main audiences, students and MSU staff and faculty, have easy access, and it was important (to me, at least) that the student farmers have as much opportunity as possible to interact with members and vice versa.

Each week, we harvest in the morning of CSA pick-up day, wash and pack the produce into plastic bins, store them in the cooler, and bring them back out again for the members at distribution (See "Weekly SOF Chores" and "CSA Distribution Set-up"in Intern Manual, Appendix C, for details). We set the bins up on a table, and write on a large dry-erase board each item and the amount each share gets. Lynn Rhodes was our original CSA table coordinator, and, drawing on grocery bagging wisdom, she instigated the practice of putting the heaviest items at the start of the table, and the lightest at the end, which we still do. Adam Montri, another student farmer from the first season, took it upon himself to make a homemade snack every week for the members and farmers, and to offer it to everyone at CSA distribution, along with the recipe. We occasionally "get it together" enough to offer snack of the week these days. I point out these small examples of fine-tuning the operation to illustrate the point that it has taken the wide array of experiences and inspirations of many individuals to bring the CSA, indeed the entire SOF, to its current level of proficiency.

There are endless possible configurations of share size and price, distribution logistics, and session logistics, particularly for multi-session (more than one per year) CSA farms. We have considered several to arrive at our current system; as the farm and

the CSA membership evolve, I'm confident the configuration of shares and membership will evolve as well. Currently each of the three yearly sessions is 16 weeks long. Members pick up their shares once a week at the farm, from 4:00-6:30 Wednesday afternoons. We strongly encourage member involvement in the farm, part of which is their weekly trip to pick up shares.

However, there are usually 2-6 members that cannot make it to our scheduled distribution time, and we pre-box and deliver their shares to a walk-in cooler on campus. This campus delivery option has worked well some sessions, poorly others. It works well when a student farmer or other volunteer is already headed back toward campus with a car, around the time those shares need to be delivered (before 4:00 p.m.). It works poorly when we have to arrange a "delivery person" to take time out of their workday to drive to campus and back. It's only 20-30 minutes, but a) it requires a personal vehicle, since we don't have a farm truck yet, and b) it's always hard to reconcile driving cars with our inherent goal of "sustainability." Those shares are packed in plastic crates, and members who pick up on campus bring their own bag or cooler to the campus pick-up site, transfer produce to their container, and leave our bins in the cooler. Members who pick up at the farm also bring their own containers, and fill them up from the "buffet" on the table.

Sessions correspond with MSU semesters: the "spring" session (actually much of winter) is mid-January through April. Summer session is May through mid-August. Fall session is September through mid-December. We have considered pro-rating share prices based on seasonal fluctuations of crops, relative to market value (e.g. potatoes are a mainstay of winter shares, but are "worth" considerably less than the tomatoes, peppers, corn, and cole crops of late summer and early fall shares). We have also discussed

keeping prices consistent but shortening some sessions to 15 weeks, based partially on that perceived imbalance in share values, but mostly on the organizational need for a respite, a breather between sessions, particularly when new student farmers are coming on board.

Bookkeeping. Managing CSA income has the potential to be simpler than any other direct market income. In its most basic form, CSA requires members to commit to supporting the farm in the form of a membership or share fee before the season begins. Each week, as a benefit of being a farm supporter, members get a share of the harvest. So the bookkeeper has only to collect as many checks as there are members before the start of the season, deposit them, and send receipts. There are widely differing variations on this theme, from all members paying up front the entire price of a share, to members paying weekly for a box they've agreed to "buy," but may or may not on a given week. The former arrangement tends to make bookkeeping simple (and provides more operating costs for the farm up front) but exclude potential members who don't have the full share cost on hand all at once. The latter offers more flexibility to members, but no security to farmers, beyond that which is established by the personal relationship with the members.

Even though our primary target audience was and is students, who demographically don't have a lot of cash on hand, we thought that to start, we'd go with the simplest bookkeeping option. Feedback from students led us to a hybridized payment system to try to include more students: members have the option of paying in one lump sum, or half before the session, and half during the session. There have been a couple of student members who have requested alternate payment arrangements (e.g. $100 per month, and $50 the last month), and we've been happy to accommodate them. We don't

advertise alternate payment options, also in the interest of simplification. Currently there is no incentive offered for paying in full up front, and no plans to do so, though we have discussed offering a discount to members who choose to pay for all three sessions in a year at once.

The very first CSA session, the club treasurer created a member database and did the bookkeeping. Initially, she used her own personal cell phone and email as contact numbers for the farm. While the club had an office and mailbox in the Plant and Soil Science building, there was no telephone. When she graduated, the job of treasurer fell into my lap, for lack of a better structure for recruiting what at that time was a club officer, and what is now the CSA secretary. I started using my own personal email, but had no cell phone.

We quickly realized that not only do members appreciate having a phone number to call for information, farmers and volunteers needed a way to reach folks at the farm and vice versa. We decided to get a cell phone for farm business use. We offered two additional shares that summer to cover the start-up cost of the phone, and try to offer one (over our 50 share limit) each session to cover the phone. Personal cell phones have been a mixed blessing at the farm: we've relied heavily on them for farm business and communication, but the distraction potential is high.

The second year, we realized that it was simpler to have a CSA-dedicated email account instead of using students' personal email accounts for farm business, and we decided to switch all farm email activity over to the former club email account, which is now the official farm business email. The club, reorganized and renamed, now has its own separate email. Our current member database is a finer-tuned version of the Excel

spreadsheet I created the session I picked up the treasurer duties. See Appendix (?) for a sample member spreadsheet.

We considered using commercially available templates for crop planning and record keeping (Rosenzweig and Kaye-Blake, 1998), but they didn't seem to meet our needs. In retrospect, I think an experienced CSA farmer and bookkeeper would have seen more value in those templates than I could my first season. It seemed simpler to create our own spreadsheet than try to learn the finer points of using pre-existing templates. Our CSA bookkeeping is currently done by a graduate student volunteer who works in exchange for food (see "Key People," pg. 24). Since we have three, rather than one, CSA sessions per year, the bookkeeping is significantly more involved than on a traditional CSA farm. Each session, Cristin sends out reminders to renew for the next session, processes checks, sends receipts, updates the member database, deposits checks with the secretary in the Horticulture department, maintains the waitlist, takes new members from the waitlist, and mails out all necessary paperwork (invitations to New Member Orientation, deadline reminders, etc.). Essentially "our" responsibility for handling money ends there. Once we deposit checks in the Horticulture dept. office, they are credited to an account that was set up to manage the funds from CSA shares. Since we are technically a "project" in the Horticulture dept, it's simple for them to house an account for us. We maintain records for our own use; the dept essentially serves as our "bank."

Back when the club and farm were one entity, we had two additional accounts. As a Registered Student Organization, the SOFI set up an account through the office of Student Life in the university, where we deposited money from fundraisers (not CSA

shares), and extracted funds for club/farm use, including flyers, field trips, and other "official" club uses. The club also maintained an account at the credit union, separate from the university account. This account was simpler to access, and we sometimes used it for minor purchases (e.g. snacks for club events, farm work days, or anything that couldn't be purchased by transferring funds within the university) and "petty cash" for small farm supplies. Since the club has officially re-organized as distinct from the farm, we now have no petty cash system, unless enough club members happen to be present at the farm when a purchase needs to be made, and can decide to use club funds. This rarely happens, and we normally use departmental reimbursements for personal cash outlay for small purchases. There is a credit card associated with the account but legally, students cannot use it. For large purchases, such as seed orders, equipment, or tools, we contact John as far in advance as possible, and he uses the credit card to purchase those items. This system is cumbersome at best, and Jeremy and Melissa both have the legal clearance to use the credit card system; they just have to go through a slightly less cumbersome training session first. We need some functional form of petty cash at the farm; it's unreliable to depend on a) student farmers having cash on hand to make purchases, and b) the department's continued ability and willingness to reimburse individuals for numerous $2, $5, and $20 purchases.

Member Recruitment and Retention. The first session of CSA at the SOF ran May-August, 2003. We offered 25 shares. In early April, the class and club members put together an informational recruitment meeting on a Wednesday evening in a conference room on campus for potential members, but word had already spread. Thanks to word of mouth advertising -- the best kind, according to farmers surveyed in Laird

(1995)—most of the 30-40 people present at the meeting came with checkbooks, ready to join. We gave a short powerpoint presentation about the history of the organization, the research and production goals, and the basic tenets of CSA. Within four days of that initial meeting, all 25 shares had been sold, and we started our first waitlist. Just over two fifths (13) of those initial members were faculty and staff in the Horticulture department and related departments, two fifths (10) were students (all but one were graduate students; the single undergraduate share was a friend of a student farmer and occasional volunteer at the farm), and the remaining shares were community members who had heard about the farm either through friends in the college, or through our listing on Local Harvest, a web directory of CSA farms (www.localharvest.org).

The original student planners in the 2003 CSA class intended to target primarily student CSA members. However, membership continues to consist of a majority of staff and faculty, and a minority of students. We think this is due to two factors: many students can't afford, or perceive that they can't afford, the cost of a share, as we require they make at most two payments of $175 each. Also, many students don't have the awareness or experience of food preparation, planning, and storage required to successfully use a share of produce each week (based on feedback from former student members who discontinued membership).

We currently maintain a running waitlist of over 50 names. We haven't had to do any advertising since the initial informational meeting; it's all done by word of mouth, our listing on Local Harvest, or articles about the farm in newspapers, magazines, or on New Farm. We have had a member retention rate of approximately 79% over the six renewal periods, 12% higher than the average rate reported by farmers in Laird (1995),

which may indicate a member satisfaction rate of above average for CSA farms. Comparing these values tells us little, however, without knowing the motivations of members for joining and continuing to support the farm. Farms surveyed in Laird's 1995 study were all for-profit farms. Ours is a student-initiated educational project, and 23% of our members who replied to our feedback surveys ranked "supporting our educational mission" in their top three out of ten motivations for joining the farm. Over half of our members are university faculty or staff, many of which have personal interest in the farm's mere existence and success, simply because it is one of the few visible projects related to organic and sustainable agriculture at MSU (personal communication, faculty CSA members). The surveys were anonymous, so there's no way to link motivations with profession, but this kind of philanthropic support may skew our ability to link member retention rate to our success at CSA operation.

Harvest and Distribution Day. Harvest and distribution has evolved from mild chaos to a pretty well-oiled machine on the farm these days. In retrospect, it was one of the many minor miracles of the past few years that we managed to get the produce out of the greenhouses and into our members' hands that first time. But we were sure we were ready. I had a rough plan of action: harvest lettuce and tender greens first, then the hardier crops. Weigh everything as it came out of the houses. Get everything into cold water to hydrocool and wash as soon as possible. Put it all in the cooler until just before pick-up time. I had faith in the students who worked there; one of them had grown up vegetable gardening and had more experience than I, and at least two others had worked on small organic farms, and had some idea of what they were doing. My intention was to make sure everyone knew our goals that day, step back and work together and see what

they came up with to accomplish those goals, and be part of the crew, but available for questions (though at that point I knew about as much as they did about what was going on). The plants were bursting out of the greenhouses, our members were signed up and paid, student farmers were brandishing harvest knives. John had thoughtfully dropped off about 10 large, old plastic bins with lids. We had access to the walk-in cooler, and we had a truck. We had knives and a scale, plastic tubs and a hose.

Our first CSA harvest included red Romaine lettuce, green butterhead lettuce, French breakfast radishes, spinach, turnips, baby beet greens, baby salad mix, pac choi, tatsoi, and mei qing choi. What happened that first day is cloudy(we had yet to acquire a farm log book to record daily activities), but I remember Oriana stepped up to wash all the dirty harvest bins, Beverly, Lynn, Jessica, and Adam started cutting lettuce like fiends, Melissa, the data recorder, was ready with a scale and notebook, and John was there to make sure we had what we needed and to see the process unfold. We got the crops harvested, weights and numbers recorded, and all items cleaned, washed, and cooled with plenty of time left to clean up.

Up until our first harvest, much of students' work had been a leap of faith, an investment into a relationship they had yet to experience. The day we harvested our first plants, and talked with members as they picked up their shares, one part of the system came full circle. It has been, and continues to be, one of my personal goals for student farmers and members alike to experience first hand as many joys and pitfalls as possible of the interpersonal relationships that make up CSA. I constantly encourage student farmers to staff the CSA pick-up table and talk with members – the feedback from one on one conversation is invaluable to improving the function of the farm, and to those

students' understanding of the power of that relationship in shaping food systems and human communities.

Originally harvest and distribution was on Thursdays, chosen for two reasons: 1) that first session of CSA, more student farmers were available to work late in the week than early in the week, and 2) It was summer, and if members were going out of town for the weekend, they could still pick up on Thursday, but not Friday. This past spring we switched to Wednesday because of availability of student farmers. Running a CSA in the context of part-time student workers whose first priority is school requires much more flexibility and orchestration (OR much lower expectations) than a full-time production farm.

At this point, seven CSA sessions in, our harvest and distribution has been fairly stabilized. We start at 7:00 a.m., unless it's extremely hot out; then it's 6:00. In the winter all bets are off – we harvest whatever day the crops are thawed and put them in the cooler until distribution day. Spring, summer, and fall, though, it's fairly routine. Every Monday morning the farm crew takes a farm walk, to observe and discuss work for the week, and also to make the harvest list. The list is mutually agreed upon by the crew; what we harvest depends on several factors: maturity and quality of crops, whether they can hold another week, if we want to harvest an area completely clean (i.e. to replant or to plant a cover crop sooner rather than later), how much and how frequently we've distributed a given crop to members, and diversity, nutritional value, and compatibility of items in the share. We aim for 6-10 items per week, and it's frequently more in the summer and fall.

For summer fruits like cucumbers, summer squash, beans, tomatoes, peppers, and eggplants, we harvest Monday, Wednesday, and Friday. Eggplants and cucumbers are stored in the warmer cooler (50 F) between harvest and distribution, and tomatoes are stored in the barn (60-80 F), due to potential chilling injury (USDA, 2004). All other summer fruits are stored in the colder cooler (40 F).

On Wednesday morning, everyone harvests either lettuce or baby salad mix first, then one person detaches from the group to set up the wash-pack area. We use 50-gal stock watering tanks and large plastic tubs for hydrocooling. One person can leave a hose running into one tank, go harvest for 15-20 minutes, switch tanks, and so on until all tanks and tubs are 2/3 full. We hydrocool all leafy greens, herbs except basil, and root vegetables to quickly remove field heat and maximize storability and quality. Most roots are also sprayed on the root washing table to remove mud clods. Baby salad mix, unless it is very muddy or aphid-infested, is not washed. We've found that dry salad mix, in air-tight containers, stores better than wet leaves, and members are encouraged to hydrate and wash their salad before using. The feedback we've gotten from members has confirmed that dry leaves store better for them than washed leaves. We normally do not wash/hydrocool fruits, unless they're exceptionally dirty. See "Harvest Day List" in the Intern Manual in Appendix C for more details.

Data Collection. Since the development of the farm was coupled with generating information about season extension, experimental design and data collection has shaped much of what we do and how it's done. Recording data at the SOF takes a significant amount of time, attention and extra organization, compared to a non-research-oriented farm. All items from inside the houses are harvested, weighed and recorded by

individual beds, in order to generate data points for John's continued hoophouse production research. We record crop, variety, number (when applicable, e.g. heads of lettuce), weight, and harvest bins. Back at the lab, Melissa transfers all this information onto the computer and subtracts known bin weights to get the actual harvest weights. All field-grown crops are also weighed, counted, and recorded. Depending on the size of plantings, the time required to collect data on field-grown crops can be two to ten times shorter than the time required to collect data from tunnel-grown crops. For example, if we harvest ten beds of spinach (equal to about three full grey bins, in our system, or enough for 50 shares), we harvest, label, and transport to the weigh station ten separate bins, coming from one to four different tunnels, and weigh and record each one separately, before washing and packing. If we harvest an equal volume of spinach in the field, we harvest three grey bins full, transport them to the weigh station, and weigh and record it all at once, noting "three grey bins" on the data sheet. With part-time student farmers coming and going at all times and days, in the early days it was a sisyphian task to try to make sure everyone knew the data collection protocol, in addition to learning how to grow crops and operate a CSA. Particularly in late spring and early fall, when we're transitioning from tunnel production to field or vice versa, and we're harvesting from both locations, the potential for lost or incomplete data is great. From a research perspective, having 6-10 part time "field assistants," for whom the data collection part of their job is secondary to other responsibilities and opportunities on the farm, appears not to be a very reliable way to generate accurate data. From an education perspective, the opportunity for students to take part in field research has great potential. Some student farmers have remarked that they are excited to be a part of generating data about winter

farming and hoophouse production, which they wouldn't be able to do at a non-research-oriented farm. Others, particularly those with farming experience or those who plan to farm in the future, have questioned the juxtaposition of this particular kind of research with a student-initiated and student-staffed farm, citing inefficiency in production and harvest methods, a skewed perspective of what CSA farming involves, and lack of control, or voice, in making crop planning decisions as reasons. Please see sample harvest data sheet in the Intern Manual, Appendix C.

Winter CSA: the "backside of the calendar": Part of the attraction of operating a year-round farm at MSU was the potential to reach more students, by farming when they are in school and in town, rather than when they leave (summer). Winter farming has been dubbed the "back side of the calendar" (Coleman, 2001), but much of the work actually happens during the "front side" of the school year. This way, students get to participate in all stages of the farm: planning, planting, cultivating, harvesting, and CSA, since all of those things occur between September and May on a winter farm. It does not, however, necessarily make labor or coordinating schedules more efficient. Running a year-round CSA, at first glance, might appear to be just an extension of what's already being done in a traditional season, or 6-month CSA. To some extent, this is true. It is more planning, more planting, more harvesting, more storage, more bookkeeping, more income, more work, but with unique twists. The basics of winter production are explained on pg. 45. The best part, so far, about winter farming has been the opportunity to amaze people, particularly gardeners and farmers, by showing them fresh greens and root crops alive and well in the hoophouses in January and February, and to provide our members and farmers with locally grown, fresh food through the winter. The

latter in itself is truly an honor, and enough of a reason, in my mind, to run a winter farm. The worst or most challenging part so far has been juxtaposing a winter farm system, a traditional season farm system, and student schedules, particularly during this start-up and development phase, when the learning curves for everyone have been high. In traditional season or "summer" farming, farmers usually have time in the winter for planning, tool and equipment maintenance,, regrouping, budgeting, and recruiting workers. On a farm that was only a "winter" farm, the farmer could ostensibly do those tasks in the summer. However, on a 48-week CSA farm, much of our "winter" shares are actually planted, cultivated, and harvested during part of the summer. For example, main storage crops such as potatoes, onions, cabbage and squash are planted in early spring to early summer and tended all summer, just like on a traditional season farm. Other storage crops like carrots and other root vegetables are actually planted in late summer, a task that would be unnecessary if there were no winter CSA (late plantings of root vegetables tend to store and taste better in the winter than early plantings). So we've essentially been trying to start, understand, and refine two distinct yet intertwined systems, with little experience in one (summer farming and management) and no experience in the other (winter farming), using a crew of part-time, inexperienced workers. While winter farming does initially appear to coincide well with a student schedule, a large amount of the work in our current system actually happens in late summer and early fall, around the time classes resume. We have yet to refine our system such that student farming can truly be complementary to student schedules.

The most challenging times are the end of spring semester (late April and early May) and the end of summer/beginning of fall semester (late August and early

September). In spring when the outside ground is first prepared, the first wave of early crops needs to be planted, spring CSA is still running, and we're preparing for a new CSA session, student workers have exams and final papers, and are dropping like flies away from the farm. In late summer, summer interns have finally hit their stride (hopefully, by August!), summer harvest is in full swing, hoophouse beds need to be prepared for fall planting, winter crops need to be seeded and planted, we're preparing for a new CSA session, and all the interns go back to school, drop to a part time schedule, and a fresh batch of additional part-time student farmers need to be brought up to speed enough to join the fray. This is a challenge unique to a student farm. We've attempted to alleviate these wildly fluctuating labor patterns by hiring additional students for fewer hours each during late spring, requiring returning fall employees to come back to work a week before classes start to pitch in and to reacquaint themselves with the farm before classes start, and to ramp up volunteering among our non-student members during this time. We've had little success recruiting more student labor during those periods; very few students want to work during spring exams, and our recruiting and organizing efforts for fall workers have fallen short. Occasionally CSA members step up and volunteer, but again, our volunteer organizing has been haphazard and needs work. We're considering implementing a work requirement for CSA members, which has the potential to be used to help mitigate labor shortages during critical times, but of course will require an additional amount of orchestration itself.

One idea that has been proposed is splitting the farm management into two roles, a "summer farmer" and a "winter farmer," each farmer having primary responsibility for the planning and scheduling of the main crops for their respective season. Both would of

course work most of the year, and help each other with daily management, but the division of planning responsibility would allow greater flexibility around "crunch times," such that one person could take dedicated time to do their planning when it's needed, rather than squeezing it in around the more immediate responsibility of daily farm work and management. The current system of one or even two managers jointly responsible for both summer and winter farming has lead to a) both needing to take time out of daily management and farm work for joint planning, effectively leaving the farm unmanaged for some time, and b) a dependence on Melissa, the research technician, to actually do the winter planning, as she's the only one already in an office when the planning needs to happen (during the high summer season, when, for lack of clear job descriptions and division of responsibility, the daily farm work claims all remotely available hands). The inexperience of farm managers (myself and Jeremy) in any form of farm management has led both of us to gravitate toward that which we feel most confident about, summer farming, essentially leaving the "gray area" of winter farming in the hands of the only person remotely experienced in any winter production (Melissa grew the salad greens for the winter salad greens production research two years before the farm started).

Another unique twist to winter CSA is the farmers' role as "grim reaper." Since crop growth essentially stops in November, in the winter we have to carefully allocate crops for weekly distribution, taking into consideration cold tolerance, storability, diversity and nutritional quality of shares, and how soon we'll need bed space in the tunnels, akin to the weekly harvest walk in other seasons, but over longer period. We've started to think of our winter harvest plan as the death toll for the crops. In October, we

take stock of everything growing in the tunnels and stored in the cooler or mulched in the field. We construct a harvest and distribution plan for the next four to five months.

As mentioned above, we try to provide salad every week, whether baby salad mix or mature lettuce. We also try to include one or two fresh leafy cooking greens (e.g. spinach, Asian greens, Swiss chard, celery, or Chinese cabbage), one or two alliums (onions, scallions, leeks, shallots, or garlic), one or two root vegetables (carrots, parsnips, beets, rutabagas, celeriac, turnips, radishes, potatoes), a brassica (Brussels sprouts, Brussels leaves, collard greens, kale, or cabbage) a fresh or dried herb, and a winter squash, as long as the squash lasts, usually the end of February. I've tried to involve student farmers as much as possible in this process, and what I've found is that they enjoy being part of the decision making process, are perfectly capable of grasping the concept of rationing stored and tunnel-grown crops, but are not always capable of making judgment calls. This is hardly surprising given that few of them even have gardening experience, let along winter farming experience.

Even though high tunnel production is the glamorous side of winter farming, storage crops play a major role in winter CSA shares. We use several methods for storing crops in winter. We have mulched crops in the field, like carrots and parsnips, which are traditionally stored that way, with mixed success, depending primarily on rodent pressure under the mulch. We have attempted to mulch and store beets, leeks, and rutabagas in the field, with mixed success. Beets we found to be highly favored among rodents. Some rutabagas stored beautifully until January with fresh greens intact; others rotted under the straw, for no apparent reason.

Leeks had variable success; about half our mulched beets last year were harvestable until March; the other half lost too much color or firmness to distribute. Some un-mulched leeks made it through winter, not to mention chisel-plowing and disking, and are flowering in the field right now. We have had better success harvesting leeks in December and storing them clean, in plastic bins, in the cooler for two to three months. We attempted to protect leeks last winter by constructing a temporary low tunnel over them, using 4' lengths of 1" black semi-flexible poly tubing bent over the beds and anchored with re-bar stuck in the ground, and covered with greenhouse plastic. I think this design could work with more supports and better anchored plastic; our "tunnel" kept sagging under rain and snow or blowing off in the wind. In the future we plan to harvest about two-thirds of all leeks remaining in the field in early December (before the ground freezes), store them in the cooler, and heavily mulch the rest.

According to the USDA (2004), potatoes store best at 68F and 80-100% relative humidity (RH), while onions store best at 32F and 95% RH, but so far in our experience they both seem to store very well sharing space in our ~40F/80RH cooler. Carrots, parsnips, rutabagas, and leeks are all stored in that same cooler, in plastic bins, for up to about two months under optimal conditions (produce harvested healthy and mature but not overmature, no damage or breaks, and reasonably clean). Potatoes, cabbage, and onions are stored in slatted wooden apple crates or open wooden bulk bins. We haven't used sand to store root vegetables yet, but we plan to use some sawdust and/or sand bins for carrots, beets, parsnips, and rutabagas next winter, as described in Bubel (1979), along with sealed plastic bins. We are heavily dependent on the walk-in coolers for winter storage: We use the colder cooler much as a root cellar through the winter. We

store potatoes, cabbage, and onions, sometimes as long as ten months, in the case of last year's onions! We just started using the warmer, drier cooler this past fall, to store winter squash, cured garlic, dried herbs, and dried chiles which we'd dried by hanging in the workhouse. We have discussed digging a root cellar for winter (and summer) crop storage, but it's dropped low on the priority list since we already have a functional, free cooling and storage system. In the interest of demonstrating low-tech, relatively low-cost season extension methods, we may resurrect the root cellar plan in the future.

I believe the CSA has been a success, based on personal conversations with members and student farmers and other local CSA farmers. Students have reported a positive educational experience, citing the opportunity to see members' reactions to crops they grew, unique relationship of working as mentors or leaders with member volunteers, and a greater understanding of the potential for CSA in their own future farm plans. Members have reported greater vegetable consumption and appreciation of fresh, local,and seasonal produce since joining the CSA, a feeling of connection to the farm and student farmers, and those with children have appreciated the chance for their kids (not to mention themselves) to learn how food is grown and participate in farm work. Two other local CSA farms have benefited from our high profile: when our membership is full, we refer folks on the waitlist to the three other area CSA farms that potential members might not know about, and two of them have gotten members that way. I think the social and community aspect of CSA has barely been tapped at our farm. We have had a few potlucks, one of which was hosted by a CSA member family, and a few work parties with variable attendance by members.

5) Summer student internship program and school year student farmer "job description:"

The farm to date has had what I've come to think of as three categories of commitments: 1) production for a 50-member, year-round CSA, 2) generating reliable research data on winter production, and 3) existing as a public place for students and the public to visit and to demonstrate winter farming methods. These are real commitments and it requires skilled labor, cohesion, awareness, and good communication to achieve them. My previous experiences farming have been on farms where everyone works full time, and often lives at the farm, so cohesion and awareness come from constant interaction with the farm system, and communication comes from constant interaction with other farm workers or managers. It never occurred to me that one could farm part time, or with a crew of part-time, inexperienced workers, at least not with any goal other than immersion experiential education. Since we've committed to the three areas above, much more than just immersion experiential farming, the farm has to operate, to some degree, as a production farm, as a research team, and as a public relations department, as well as an ecological agriculture learning environment. After one year of patchworking together a piece-meal, part-time crew, it became obvious that we needed a more reliable and organized labor system. Since it is rightly a *student* farm, and most students have no farm experience, reliability had to come in the form of structure and formalized expectations. Organization of labor has come with time and experience and the ability to make informed judgment calls.

The creation of a full-time summer farm internship has been my personal project at the farm. With support from our education coordinator, and, more recently, my co-manager, we've pulled together the foundations of an integrated working and learning

internship. Based on my experience as an intern at a farm in Massachusetts, my experience working as a farm hand in Chelsea, and the past farm internship experiences of student farmers, we have started a summer program that still needs lots of fine-tuning, perhaps even over-hauling, but has improved farm and CSA function substantially over the first summer of an all part time work crew. This idea was born before talk of a formalized teaching program started. If the teaching program develops as projected, it could conceivably fill the same niches (in education for students and in labor for the farm) as the internship.

The internship, as conceived presently, is not dependent on any additional resources (human or financial). And, while less formalized and with the potential for reaching fewer students than the teaching program, it is flexible from a long-term management perspective. That is, what exists of internship structure currently is documented and can be carried out by a competent, experienced farm manager and educator, is malleable enough to be adapted to each manager's and farm crew's personal interests and intentions, and, at worst, can even be scrapped in favor of hourly labor if necessary, with no significant upheavals in management or farm function. While every farm has its unique goals and logistics, I hope that the story of the evolution of our summer internship will be helpful for other student farms thinking about labor and learning. "It's not just a way to trump up cheap labor, but a committed partnership that requires a real investment from both farmer and student" –Dan Kaplan, manager of Brookfield Farm in Amherst, MA, one of the most well-established and well-known CSA farm internship opportunities (in Sullivan, 2005).

The first two years: A crash course in management. Our first season, spring 2003, was chaotic, as might be expected of the first year of a part-time crew of student farmers with a wildly divergent array of farming experience among us, a 25-member CSA to supply with 16 weeks of produce, starting in May, a research agenda that required some horticultural competence and attention to detail, and the expectation that the farm was to serve as a model for other farms or farmers. During the school year (Jan-early May), students worked 6-20 hours per week, depending on their availability, interest, and skill level (at that point skill level equaled ability to see that something needed to be done, and doing it). I came on board expecting to work farm time in the summer (as long as it takes to get the work done), and part to full time in the winter (I was paid for a half-time graduate assistantship, or 20 hours per week, but I had some understanding of what running a farm meant, and my graduate "research" was so enmeshed with farm operation that I'd planned on full time work outside of coursework). I had a vague understanding of what winter farming would entail, but no experience on which to base those expectations. I expected student farmers to work farm time in the summer, but didn't know what to expect from the school year, since everyone, myself included, was taking classes. It had been three years since I had been in a formal education setting, and six years since my full-time undergraduate years. Once I started to settle back into the chaos and distractions that characterize student life, I expected about as much from the school year work schedule. I had no labor expectations other than working full time and hoping student farmers showed up when they said they would, and worked hard the whole time they were there.

Come summer, however, after classes were over, and the CSA had gotten under way, as manager I was unprepared for the piece-meal crew with patchwork schedules with which I was greeted. My only experience farming has been full time, with few outside commitments. Partly as a function of my inexperience farming, partly from being overwhelmed and essentially unable to think more than a week in advance, and partly because it never occurred to me that one *could* farm part time, in the summer, anyway, unfortunately I did not consider the work crew format much in advance of the summer. What I was greeted with were about five students who wanted to work part to full time, at any and all hours of the day, at their convenience, and who, for the most part, expected and needed me to orchestrate it, akin to any other campus job. These weren't just any student workers off the work-study list; they were the ones who started the farm, who built the greenhouses, who, to some extent, had an idea of the amount and intensity of work it takes to farm. That is to say, with any less skilled and committed a group of individuals, I doubt we could have pulled it off that first summer.

We had no job descriptions, official expectations, specific organizational goals or timelines, and no time allocated to create them. At that point we had no hiring process, other than John (who had also never started or managed a farm, let alone a farm with our multiple roles) knowing a student personally and offering them a paid job. This model of student farming could succeed in an environment without standing commitments, i.e. a student garden where the "farmers" are growing food only for themselves, or for a market, farm stand, or food pantry with no existing expectations. (That type of farm could probably get by with no paid employees if necessary.) For our level of commitment to CSA members and necessary rigor of following research planting and

harvesting protocol and data collection, that particular model of part time farming was unnecessarily challenging.

It will come as no surprise to anyone who's ever managed a crew of workers that simple strategies like everyone starting at the same time in the morning, if not leaving together, or having a Monday morning check-in meeting, are important parts of an informed, competent crew, and hence a smooth running farm. While I struggled with keeping everyone up to date and up to speed on farm work and news, it took a while to realize these simple management techniques.

After the first semester, we adopted two communications tools that helped raise the level of collective competence: a dry-erase board and a farm log, or journal. Up to that point, we had been doing much of our communicating via email, but we had, and still have, no internet connection at the farm. On whichever day the most people were available to work, we would take a farm walk, on which we'd tour the farm together, noting changes since the last week, what work needed to be done that week, and what was to be harvested for CSA. These walks were an attempt to get everyone up to speed, to help student farmers get in the habit of observing and assessing changes, and prioritizing work. It was a classic case of the blind leading the blind, as I had exactly as much experience on that farm, in that system, as any of them. Farm walks were intended to help further our goal of experiential education, making the farm more than just a job.

The walks met with mixed reception. Some students participated and enjoyed them; others disliked doing anything but physical work while at the farm. Melissa normally accompanied us on the walks. She took notes and sent out the weekly farm update to the list serve. Student farmers and all interested parties received the list of

work that week, and paid employees chipped away at it over the week, and several times a week, volunteers who received the list via the email list serve would also drop by to help out.

The farm log book was our first step down the path of "documentation-for-experience substitution." We started recording daily activities (field and bed preparation, planting, harvesting, greenhouse repair, hosting visitors, etc) and questions and observations. Everyone read the log, and could reply to or add on to anyone else's entry. This system is still in place. Though much of the quantitative data now has its own official recording protocol and location; we still use the log for qualitative observations, questions, and thoughts.

If not for the farming experience and fast paced, high quality work of Beverly and Emily, the experience, attention to detail and competence of Lynn, the experience and constant questioning of Oriana, and the steadfast presence and positive energy of Adam, our only close-to-full-time worker that first summer, the SOF and the CSA would never have gotten off to the stellar start that they did. It was very much a team effort, albeit without much of a game plan, that first summer, but the team members waxed and waned on their own clocks, and any effort at organized teamwork was usually undermined by divergent schedules and personal agendas.

For example, every time I tried to organize a hoeing team, one or more of the student farmers would decide that they'd rather handweed or wash buckets by themselves than hoe with the group. Since we had no structure in place that said they had to hoe with the group, and I, at that point, had not much confidence that my hoeing job was a higher priority than their handweeding job anyway, there was not much cohesion in the group

that summer. These were students who had worked at the farm building hoophouses, or working for John on campus, before the CSA. They were very empowered, proud, and personally invested in the farm, since they had built it, literally, from the ground up. They knew that their opinions were at least as valid as mine, and I wanted to foster that confidence, perhaps more than to get the hoeing done. Perhaps both are possible with clear, mutually agreed-upon mission, goals, and individual roles and responsibilities. We're working in that direction currently.

When our second summer was approaching, I wanted to take a different tack. Emily, then the education coordinator, and I, as well as the student farmers, had dedicated lots of winter time to discussions of personal internships past and how we wanted the farm to run that summer. One of the most frequent comments from students working in the school year was that they felt they were missing the "big picture" or a sense of continuity from day to day or week to week, depending on their work schedule. School year work is essentially forced to be all part-time labor, if we intend to remain the *student* organic farm, but summers have the potential to provide a more holistic farming experience for students, and a more coherent work force for the farm.

We agreed that we wanted full time, or nearly full time workers only, that we wanted a standard, common work schedule, that we did not want to encourage anyone to take classes or have a second job and try to work at the farm, and that we wanted to make a somewhat more formalized sustainable agriculture education experience. Near the end of spring semester, we held our first farm "beerluck," where we discussed personal goals and desires for the summer. The full-time summer interns, the part-time spring "pinch hitters" (school year student farmers who were leaving for the summer, but sticking

around for the month of May to see us through the spring planting push), the graduate student manager and education coordinator, and the faculty advisors gathered in the house of two student farmers. The spirit and format of the beerluck was successful for engaging students in a co-creative, peer-led brainstorm and discussion. We established goals and priorities for each individual and the intention to work toward "true community" as a whole. Since that first beerluck, we've had only one similar gathering, the end-of-season reflection and celebration party and meeting that fall. Some students hopefully asked "are we having another beerluck?" No official beerluck-organizing responsibility exists at the farm, so we did not.

That summer we had four full time interns, along with three May pinch-hitters, and a fluctuating pool of one to five volunteers. Three of them were truly full time, working at least 40 hours per week. The fourth was taking a class, and unfortunately realized partway through the season that he couldn't work full time and pass his class, so he fluctuated between 25 and 40 hours. Each intern had their own farm project, and some had an 'adopt-a-crop' crop responsibility as well. We intended for each one to be responsible for one crop or crop group, as well as carry out an individual project of their choice, to improve the farm in some way. Joe chose potatoes as his crop and exploring biodynamic agriculture methods as his project. Scott chose irrigation as his project which, since we had irrigation systems for only two of our then four fields, required design as well as construction and maintenance. Michael chose flowers and herbs as his crop and value-adding (e.g. drying flowers and herbs for winter distribution) as his project. Fred chose tomatoes as his crop, and somewhat by default, bed preparation and tractor cultivation became his "project." Fred had worked as a Hort Farm employee two

summers ago, and had the trust of the Hort Farm managers to borrow tractors and equipment, more than any of the rest of us (one of many examples of the farm running on serendipity, or the "village making the salad."). Ashley, an education major who worked half the summer at the farm, designed the first intern manual as her project, and did not take on a crop. Emily chose peppers as her crop, and served as the liaison to a research group doing a participatory research project on organic pepper varieties. We participated as one of several farms across the state growing and evaluating ten varieties of peppers, which we then gave to our CSA members.

Emily, though officially the education coordinator, was by all accounts the field crew leader if not co-manager that summer. Her role as pace-setter in field work extended to that of "most competent worker" all around, and, job titles aside, we were essentially running the summer farm together, with Melissa stepping up to organize all the winter farm planning and preparation. Everyone was responsible for planting, cultivating, harvesting, and CSA distribution; we tried to rotate student farmers weekly at CSA distribution. We tried to implement specific on-going farm responsibilities, in addition to individual crops and projects, such as pest/disease scout and monitor, maintenance person, or baby salad specialist, but since neither Emily nor I had enough experience with whole farm management, it was difficult to a) appropriately define and design specific tasks, and b) match duties with individuals. See the list of "Things you can be in charge of" in the Intern Manual, Appendix C. The CRAFT descriptions of first year, second year, and third year farm apprentices, and the Michael Fields Agricultural Institute descriptions of first, second, and third year garden students both have good breakdowns of specific tasks and concepts appropriate to students at the different

experience levels, developed over years of experience farming and teaching others to farm. We were "shooting from the hip" in terms of farming and farm teaching experience, had not encountered these documents yet, and it felt like we had no time to read them anyway. So we continued to rely on individuals to gravitate to jobs they wanted to do, much as in the first year, but with more cohesion as a crew, and with better communication.

It helped quite a bit that year that three of the summer crew were already friends before working at the farm. It created an atmosphere of friendship, trust, intimacy, and humor that we haven't seen since. Although students were paid for up to 40 hours, they usually spent more time at the farm, working on personal projects outside the scope of the internship, hanging out (because that's where their friends were already), walking in the woods, sometimes writing. Since they had gravitated toward the farm as a personal project (particularly those who had been there from the beginning), and as a way to work with their friends for the summer, the farm was a social venue as much as a workplace.

That year everyone except Joe, who was enrolled in classes, and Tomm, who came on in August, worked full time. At the request of all involved at the beerluck, we implemented farm learning days, one afternoon a week set aside for exploring topics related to the farm, chosen by the interns at the beginning of the summer. Each student farmer or manager was responsible for planning and organizing one learning day. We covered topics like biodynamics, herbs, and organic certification. My intention was to include field trips to other farms in our learning days, as a precursor to my intention to establish a Collaborative Regional Alliance for Farmer Training (CRAFT) program in Michigan, as described by the CSA Learning Center at Angelic Organics at

www.CSALearningCenter.org. The learning days were spotty throughout the summer, but those that happened were well received.

In August, one of the interns informed me that he would be leaving within two weeks to pursue a recent job offer. This came at peak summer harvest and winter planting and prep time, and I was shocked. Thankfully we were able to hire a part time student, who also worked at another area CSA farm, as a dedicated summer fruit (tomato, pepper, eggplant, summer squash, zucchini, cucumber, and bean) harvester for those things that needed to be harvested three or more times per week, though not necessarily to participate in learning days or be responsible for other farm work. Tomm has stayed on as a school year student farmer, as well.

One of the most frequent comments we have received in check-ins with student farmers is that they like having personal responsibility for one area of farm operations. While not allowing as much time to experience the "big picture," as would participating in all jobs all the time, it allows them to become skilled enough in one area of the farm to feel ownership, and to teach others what they've learned. So we've identified that student farmers want a breadth of exposure to the whole farm system, and a depth of experience in focusing on a few, discrete personal responsibilities or focus areas. I believe it's important to match student farmers with tasks appropriate to their level of understanding of the farm system, particularly in this development phase of the farm, while managers are new farmers ourselves and haven't yet figured out the whole farm system, let alone the best way to teach that system to students.

This third summer Jeremy and I tried to create a more coherent experience for the student farmers, with clear expectations written down, based on the past two years'

experiences, with a stipend rather than hourly wage system, to reduce the uncertainty about paying wages for learning days or any learning time, and a more organized work week. Our interview process and general workplace tone has led to a less personal, more "job" oriented environment. Student farmers start work at the same time every day; we hold Monday check-ins and farm walks, each of them is responsible for a crop, much as last year. However, none of them were friends before coming to the farm, and through the interview process, it became clear that they would relate to the farm as a job, rather than a personal passion, if forced to choose. The routine is more standardized, the relationships less personal, and the level of competence and pace of work still depends on each individual, though more focus on group projects has allowed us to function more as a team. We've learned that personality plays a big role in the success of the farm on a daily and seasonal level. Student workers who already have a rapport and trust with each other have tended to form a more cohesive work team and provide an all-around more pleasant work environment. I believe that a student farm with established job descriptions and farming systems, which hires students to work as a job, can take advantage of both the high morale of friends working together and the efficiency of a structured labor force (though the same could be true of a for-credit program, if friends recruited friends heavily).

I wanted from the beginning to use my experience in environmental and agriculture education to create an internship environment where students could learn enough basic small-scale farming skills to keep the CSA running, engender in each of them a personal responsibility for the farm, and hopefully provide physical and intellectual space for them to explore farm-related questions on their own, and nurture a

physical space and social community of people interested in thinking for themselves and living and learning differently from the university student's status quo. In retrospect, these goals were ahead of the developmental stage in which I encountered this farm, and I've spent my time and energy learning, on the fly, enough about student farming, winter farming, and farm and CSA management just to keep the CSA afloat, the winter farming operational, and students or myself from cutting off extremities or breaking bones (and we still have one concussion to show for it).

Employee/Intern Supporting Materials. The second year into the project, I realized that documentation was going to be a very important piece of this farm puzzle. I had no experience managing a farm, and little to no time to research literature about farm management or even consult with other farmers, because I was still farming and taking classes during the winter, when CSA farmers typically have time to read, research, plan, and compare notes. If the farm was going to continue in a similar management vein (part time, inexperienced student manager), I realized a manual on site would be invaluable to future farmers. I often wished I had one! Even though what we were doing at the time was still very experimental, in terms of efficiency, it was worth documenting what we tried and learned so future farmers wouldn't have to "reinvent the wheel." Much of what we've "learned" has been reinventing wheels that probably could have been identified with more preparation and planning time, i.e. the one year recommended in Henderson (1999) and Laird (1995), and by consulting experienced farmers in the initial proposal process.

So we started printing out everything for the student farmers. I printed harvest data sheets; Melissa printed bullet points on winter watering tips. As a document came

into use at the farm, we gave a copy of it to each student working, and a folder to put them all in. If those students managed to hang on to everything we gave them, they had a fairly complete employee manual by this year. Just in case, however, for the summer 2005 batch of three interns, Emily and I compiled a binder for each of them, with all of our expectations, methods, helpful hints, summer learning contracts, maps, etc. Please see Appendix C for a complete copy of the manual.

6) Development of a farm visit plan and protocol, funded by the USDA Higher Education Challenge Grant

According to a summary of educational activities on the farm by Emily Reardon (2005), work on the USDA Higher Education Challenge Grant began in the fall of 2003. The grant proposed four objectives; 1) Students and faculty will engage in year-round, small-scale organic food production (soil/sow/grow/harvest/store) of food crops in a Northern community farm setting, 2) Students and faculty will develop and apply sustainable, profitable models to market local food and a healthy lifestyle, 3) Students, faculty and community members will engage in experiential research and teaching in an interdisciplinary community farm setting, and 4) Students, faculty, and community members will integrate economic, agronomic, environmental and social aspects of a farming enterprise. The Student Organic Farm was already a student-operated business, and therefore by its very nature, fulfilled objectives 1 and 2. A graduate assistant (Emily Reardon) was hired in order to facilitate the third objective. Emily's role was to contact professors, work with them to connect an experience at the farm into their own teaching at the classroom, and arrange the visits to the farm. The proposed goal was to bring 500

students a year to the farm. Students were surveyed and numbers of courses, faculty, staff, and farm visitors (including students) was recorded. The first year of the grant, the farm saw 428 students, and another 1019 were exposed to the farm through classroom visits. The second year 955 students visited the farm, and another 685 had classroom visits. Although we did not reach our goal the first year, we well passed it for the next. Students who came to the farm learned about topics such as Community Supported Agriculture, the Living Soil, Diversified Vegetable Production, High Tunnel Winter Production, Compost Production and Use, and Organic Insect, Pest and Disease Management. These topics were chosen based on the knowledge and experience of professors and students involved with the student farm. Students toured the farm, listening to farmers talk about the topics that could apply to their classroom study. They were also then engaged further in the farm through hands-on activities. Students planted peas and salad greens, and harvested potatoes and other vegetables in order to gain a more complete understanding of what it means to grow food.

There was a strange disconnect between the supposed "education" goals of the farm and the actual education of those most directly involved in the farm, the student employees and volunteers. As described above, the "education" funding was directed at classes visiting the farm and outreach to local schools and groups, but not directly at student farmers. The student farmers of course benefited from the opportunities to lead tours, participate with visiting classes in on-farm directed projects such as building compost piles, and from the sense of ownership and empowerment that comes from sharing their work and experience with their peers. However, I believe the students who put in the most work at the farm (first the club members, later the employees and

dedicated volunteers) received the most "education" just by doing the daily work of operating the farm. And the quality of that pure experience could be ameliorated by the adoption of Kolb's (1984) four components of successful experiential education: concrete experience, reflective observation, abstract conceptualization, and active experimentation. I believe on a student farm "education" funding needs to go toward creating the deliberate opportunity for students to engage in those four steps, not just exposure-level tours.

Summary

The goal of this section was to tell the story of the SOF in a way that would be useful to other student farms. The categories or accomplishments summarized here are not all inclusive, but a good representation of what is important to me, others a the SOF, what I think will be useful to others, and what I had time to write about while still farming.

Chapter 3.

Recommendations and Conclusions

1. RECOMMENDATIONS FOR STUDENT FARMS

Much of what follows has its roots in my very elementary level study of Holistic Management theory. HM is not a mysterious or secret code; rather, it's a name given to a

learned, holistic pattern of thinking, and hence planning. I'm interested in the potential of HM in the context of student farming in particular because it has the capacity to be an inclusive management strategy and mitigate some effects of transient personnel, if documented and communicated to each generation of farmers and managers. See the Literature Review under the "Farm Planning" section for HM resources. All of this section is based on my experience here in the past 2 ½ years and my exposure to other farms, both in person and in personal stories and literature. It is not exhaustive; it's one entry-level farmer's recommendations to other entry-level student farms.

Think Big, but Start Small and Simple

"Small is beautiful." –E.F. Schumacher

This might sound self-evident, and I've even heard it invoked even in our organization, but small means different things to different individuals. Whatever your group's common definition; and it's important to clarify a common definition out loud and on paper; stick to it. Officially, that is. The smaller and more realistic the goals and commitments, the more likely they will be accomplished. Small and simple does not have to insult anyone's intelligence or ability. Starting intentionally small sets the stage for individuals, empowered and inspired by small successes, to branch out, think big, and look their big, hairy, audacious goals squarely in the face. At the SOF, our idea of "small" to start was to only start with 25 CSA members our first session. I say this tongue-in-cheek, because we obviously did not start small. We started by thumbing our organizational nose at every small market and CSA farm recommendation about planning years, core groups, establishing a farm stand or going to market before attempting CSA.

We had no personnel roles with job descriptions, no decision making model, and no clear budget, let alone an official vision, mission, or goals. As a result, we bit off more than we could chew, and much of our development phase has been characterized by confusion and scrambling to get our collective feet under us, as well as the challenges of farming and organization management. Nearly every guide to starting a farm or small business (see Henderson, 1999, Laird, 1995, Guenthner, 1992, Sahlman, 1997, for example) recommends some combination of these things; it is not inaccessible advice.

Design a system based on intentions and guiding principles, and establish clear, mutually agreed-upon vision, mission, roles, and goals

"Form follows function." (Bauhaus)

Guiding principles, also known as core values or organizing principles, are the heart and soul of any organization. Around what are you organized? Why is this organization or project personally important to you, and distinct from others? What guides your choices? Guiding principles are not goals or objectives; they are the emotional and philosophical underpinnings of a vision and a mission. It is important to establish, with input from all key players, these group principles as early as possible in the development process.

Based on the core values or guiding principles, develop a vision toward which your organization wants to work. Based on that vision and core values, identify and get buy-in from all key people on a clear mission. Be specific. Our mission, "to cultivate a community supported student farm" is too vague, in my opinion. Use action verbs and enough nouns to clearly convey all key desires of the organization. For example, a

"community supported farm" does not necessarily mean CSA. In the interest of remaining flexible and open to change, this is perhaps a good idea; the CSA aspect of the SOF could be substituted with some other form of community support without deviating from our mission. However, I know from experience with the individuals involved that CSA *is* in fact important to all of them. The mission should convey that intention. "Student farm" is also unclear. In our case, it has meant an organization started by students, run by students, benefiting both students and community members, but with ultimate responsibility and decision making power not in the hands of students, which might be inherent in a university-sponsored "student" farm. Again, this is fine in the interests of remaining flexible, which is important, but what does a student farm mean to this particular group? A farm that grows food for students? Offers part time jobs to students? Provides educational programs for students? The more explicit the mission statement, the better, and the simpler it becomes to define roles and goals.

In the early phases, roles and goals will co-evolve. Goals are what you work toward to fulfill your mission. Within each goal should be clear objectives, or quantifiable benchmarks by which to measure progress toward goals. Our stated goals are organic production, year round local food, diversity, and experiential learning. We don't currently have clear stated objectives with measurable outcomes, and the core values and mission came out of lengthy meetings of transient people. The goals were finally established by John and Laurie taking personal initiative and deciding on them. If you do this work in or even starting before the planning year, it's easier to get more people involved, and to get the full attention of those involved (i.e. if they don't already have a farm and CSA to run). We started without any clear job descriptions, since we

were all new at this. We didn't know what each job might be, let alone entail. I was hired as "farm manager," Emily was the "education coordinator," Melissa the "research technician," John and Laurie the "faculty advisors," and all the students (as well as Emily and I) were "student farmers." We made up our job descriptions as we went, and when we hired Jeremy as co-manager, he had at least a list of duties for which he would be jointly or personally responsible. We've been refining them over time. Consult with farmers for the amount of time and experience necessary to do the work necessary to meet stated goals, break up responsibility accordingly, and budget enough time and money for people to do that work. If inexperienced people are hired, add learning time accordingly.

At the SOF, we waited until our first winter (beginning of our second year) to formally recognize that we had guiding principles, or core values, as we called them. We had been operating under the assumption that we had common values; we were all drawn to this visionary venture, after all; but had never taken the time to talk about them, as a group. One of the original student visionaries and instigators of the SOF made an astute observation in his reflections on the creation of the group's goals: The same can be said about core values. It has helped me enormously to have a point of reference, which I *know* is commonly accepted, by which to measure decisions. This is not to say that we as an organization actively invoke our core values at our meetings; we have neglected to employ them more often than not. We need practice. We need a poster or list of core values at every meeting, perhaps at the head of the table. At every major crossroads, and perhaps at the minor ones as well, we need to ask, "Does this embody our core value of

Love?" "How does this choice reflect the value we place on Diversity?" "What opportunities will this decision bring about for fostering Curiosity?"

Allan Savory's A student farm is different from a for-profit farm, even if one of the goals might be financial self-sufficiency. In our case, education, demonstration, and research are driving forces in what we do, even from before we had "official" core values, and we make choices different from those a for-profit farm might make. As Elizabeth Henderson so eloquently put it in *Sharing the Harvest*, "One year I even grew wheat on a raised bed. We scythed it down by hand, fed it through an old combine to separate out the grains, dropped the grain off the barn roof on a windy day to get rid of the chaff, and collected enough grain for five loaves of the best-tasting bread I ever baked. Was that efficient? Are you kidding? Did that matter? Of course not. It was definitely worth the effort to me and my son and his whole fifth grade class, who got to taste the bread with honey from our beehives" (pg. 69). Her barn, her son's class, their honey, and the process of learning about grain production were the key pieces in this scenario, not a profit or time efficiency. Student farms are similarly outside the "single bottom line" scenario, and have to establish equally creative standards by which to evaluate decisions and experiences.

<u>The more people involved the better! Esp for visioning/brainstorming and LABOR</u>

The SOF is an organization housed in the Horticulture department. We use Hort Dept resources, our advisor is a horticulturalist, and many of the first generation of student farmers were Hort majors. We were a little unbalanced. An understanding of how plants grow and experience growing plants is of course helpful in farming, but how many horticulture majors have experience fixing tractors? An understanding of rural

sociology and the importance of small farms? Skill in presenting arguments about gender, race, and privilege to a group of FFA high schoolers? Previous exposure to the concepts of local food and food security? In my opinion, these topics are equally important to our success as the ability to produce a flat of healthy transplants. A university is a unique place, rich in diverse knowledge and experience. Use it. Bring in students from many disciplines, and faculty. Bring in staff: research technicians, nutritionists, extension agents, livestock specialists. Involve students in the planning as much as possible to get the student voice in the vision and mission, but involve individuals who will be around longer for both diverse thoughts *and* continuity. We have had some luck offering produce in exchange for expertise or equipment loans, but involvement, investment, and commitment have to come from an interest on each person's part; it's hard to barter for personal inspiration. Back in the early visioning stages of the farm group, there were soil scientists, an anthropologist, a community organizer, a student who grew up on a farm, an environmental science teacher, a local farmer, *and* undergraduate and graduate students, horticulture and otherwise. Along the way, many of them have faded from the picture. I want them back! This section's heading should really say "The more people *dedicated and committed* to *staying* involved…" In the formative years of the SOF, before there was "SOF," a wide variety of people came together and came apart, and back together again, according to meeting minutes from the early years. This is perhaps inherent in student organizations, but these were students, faculty, and staff. Diversity builds strength. Drawing on multiple intelligences can only bring forth a well-rounded and resilient set of core values, and hence, vision for an organization *if* the intention and resources are present to establish

those values and visions, not just talk about them. That is, the more the better AND some structure helps, too.

Establish and nurture good relationships with many allies

Once people in the university and local farm community are aware that a student farm exists or is in the works, they might come forward and seek it out, if they are personally interested. More likely, they will be willing to hear about it if you seek *them* out. Most people with whom I've spoken about the SOF are intrigued and encouraging, if not able or willing to become involved. If you suspect they might be able to help the farm at any time, present or future (or if you just enjoy their company!), cultivate that relationship. Drop off a bag of salad greens or a bouquet once in a while. Farms usually have some extra produce, very rarely extra time or money. There will be some individuals, e.g. local, experienced small-scale farmers already familiar with some of the work to be done at the student farm, who can provide technical support and expertise, as well as a peer community. These are people to stay in touch with, to help whenever possible, in short, to pay attention to and be a good neighbor. Farmers are each others' closest allies and best resource (Guenthner, 1992, personal communication with farmers, and personal experience).

University employees in expected and unexpected places can also be good allies. It's always a good idea to be on good terms with administrative and secretarial people; invariably you'll need an emergency batch of copies or list of student employees, for example. At land grant universities, or any schools with other farms, other farm managers and personnel can be great assets. Stop by, tell them what you're doing or

planning, and find out who has what lendable equipment, access to old, unused tools, or can donate seed potatoes, for example. Find out what you can (or plan to be able to) do for them in return. In our case, we developed a relationship with the MSU potato breeders, and their lab supplies us with seed potatoes each year. They're not organic, but they're as local as they come, and not GMO. So far that's been a one-sided relationship; we owe them a favor. I try to thank Bill and Gary, Hort farm managers, personally for everything they do for us. We share what few tools we have that they don't have, we offer to help out with their annual fruit sale (at least by staying out of the way!), and at least attempt to return equipment in the same or better condition than when we borrow it. We have baked them cookies in the past, and we often share produce with them, particularly baby salad mix, one thing they don't grow themselves. In fact, baby salad mix has been one of our best recruitment and bargaining tools. I've found that making time to sit down with the Hort Farm managers and discuss our needs, assumptions, daily activities, and yearly projects has helped relations significantly. It not only clarifies logistics, it establishes open communication, transparency, and trust, all helpful since we essentially exist and operate there at their mercy.

Other student groups can be excellent allies, for information, membership, and help with group projects requiring lots of labor. Establish ties with those groups as early as possible to recruit student farm organizers, and maintain those relationships to a large labor pool and social community. Try hosting a party or potluck at the farm, if it exists, or at the home of a student farmer, for all environmental, health, and/or outdoors-oriented student groups. Get to know each other, find out how you can help them, and keep them

informed of farm events, both work and social. Get a web page and a list serve, and keep both current and active, since email and the web are a first resource for information for many students.

Take a Planning Year With Faculty, Farm Managers, Education Coordinators, Students, Core group (if CSA, or other broad-based advisory group,), Get Buy-in from All

According to Laird (1995), 58% of successful CSA farms took a year to organize, plan, make a prospectus and budget, hire farmers, and form a core group or some way for farmers and members to communicate. A student farm is going to have a somewhat different set of circumstances than a member-driven CSA farm, but the need for solid planning is common to all visionary ventures. The MSU SOF as a concept evolved out of three years of students talking, dreaming, visioning, and planning, but the actual details of the organizational structure and physical farm and farming systems were left to evolve as the farm and CSA were started. Once a site and funding were secured in 2002, a farm manager (me) was hired, but not to start until January, 2003. The first CSA session was slated to start in May, 2003, with planting to start in February. This decision added several preventable challenges to the already demanding job of farming. First, neither I nor anyone involved had ever started a farm before, or been primarily responsible for the creation and management of a CSA. I had never managed a farm. I was not familiar with any of the resources available at MSU or the greater Lansing area. I did not know any of the people, organizations, or departments with which we have developed or would like to develop cooperative relationships. I was unfamiliar with the group's history and past conversations and decisions, or guiding principles. In short,

there was little reason to believe I could start and run this farm, let alone guide a group of undergraduate students through the process. In light of these circumstances (my inexperience managing a farm and with this particular group, little time between farm establishment and first CSA session, the part time, patchwork nature of a student crew), I came into this position expecting some sort of information transfer. This could have been a business prospectus for the farm and CSA, a timeline of organizational goals, a list of and/or introduction to key allies in the university, or a combination thereof. At the time, I was too inexperienced in both farm management and navigating the university environment to know to ask for these things. We have started to create these resources.

I now realize it's a good idea to have all these things in place for new personnel, in the development phase as well as after the farm is operational. I suspect that someone well versed in organizing and/or business management could have told us that before we started, if they had been invited to the table in the early stages. Recommendation: invite them. Invite everyone you know or know of who could possibly be interested in a student farm. They may someday be a resource. Make sure ALL identified key players are present for the planning year. This includes faculty advisors, farm manager(s), education coordinators, key student leaders, potential CSA core members (if planning a CSA), local farmers who have offered support as a result of participation in the visioning and brainstorming phase, and university allies, both closely affiliated support staff (e.g. university farm managers, office personnel, greenhouse coordinators, etc) and faculty who have offered support as a result of participation in the visioning and brainstorming phase. Their input and participation in planning will depend on their intended level and frequency of interaction with the farm.

Communication is another key consideration for the planning year. On our farm, communication has been one of our biggest challenges, and we've made great progress compared to the first semester, making changes as we go. However, having at least the beginning of a clear communication system in place when you need the farm to operate is preferable. Some of our constraints with regard to communication are part-time staff (student farmers) with different schedules – it's hard to get everyone together, particularly during the school year, uncertainty about whom to ask which questions (a reflection of our lack of clear job descriptions and decision making model), and starting out with no phone and no internet access at the farm while being dependent on them for communication. We've addressed these challenges with the farm log, dry-erase and chalkboards on site, implementing a standardized full-time schedule for everyone in the summer, weekly or biweekly meetings in the school year, and giving a phone and email list of everyone involved to everyone involved each semester. I recommend some kind of orientation for new student farmers each semester, to introduce them to key players, even if they won't come into contact with them every day, so they know who to ask what, and how to reach them. Paid weekly or biweekly meetings have helped everyone keep informed, though we still need a clear decision making model. Our steering team of faculty advisors, managers, research technician, and education coordinator take place independently of the school year student farmer meetings, and while it's important to keep all key people in the loop, we need to be more efficient at using meeting time. Too many meetings can drive people away. An on-farm phone is important, and our farm cell phone has made organizing and communicating much easier. Internet access for us is the

next step; since we depend on email for most group communication, and the nearest internet access if four miles away.

Take a Trial Growing Year

Farming is a skilled trade, an art. Like any art, it can be practiced and enjoyed by people of all skill levels. To produce reliable, high quality products, however, requires some level of farm competence. Farming competence, in the case of student farms, is very much a function of identifying realistic goals, flexibility and juggling multiple agendas and schedules, moreso than on a family or full time farm. Based on our experience to the contrary, it would be beneficial for at least managers, and preferably student farmers as well, to have at least one season's experience on site before committing to any business arrangement, but particularly a CSA. It takes time and attention to construct cropping plans, lay out fields and beds, design irrigation systems, start to identify what equipment and supplies are still missing, establish key relationships, trial out hoophouse production in the case of winter farming, figure out communication systems, and keep developing organizational structure and function. And if farmers are inexperienced and part time, as in our case, those tasks take even more time and attention. We (the SOF) are still trying to design short, medium, and long-term cropping and fertility plans for the farm and establish organizational structure and decision making models, both of which could have at least started developing before we dived into CSA if we'd had a trial growing year, perhaps combined with the planning year.

As Seth Murray (instigator of the original SOFI group) noted in his reflections on trying to start the farm as an organization in 1999, students are turned off by meetings with no accompanying action. People, and students particularly in my experience, like to take action, not just talk about actions. A trial growing year is a perfect opportunity for people to get their hands in the dirt with no strings attached, while continuing the planning process (or starting it, depending on how early in the process a site is secured). It can literally help ground people's discussion and intentions for the farm's function.

Consider Funding Options and Conditions Carefully

Before asking anyone for financial support, carefully consider what you need, when you will need it, and how much it will cost. The planning year is a great time to do this. Weigh each of these expenses against your group's core values before including them in the budget. Construct a short tem (one year), medium term (2-5 years) and long term budget (6-10 years +) derived from short, medium, and long-term goals. I strongly suggest that key players, whether in the form of a core group, steering team, or club officers, spend time with the holistic management (HM) goal and budget setting processes described in *Whole Farm Planning* (Henderson, 2004), if not more HM resources. Consider a simple scenario: if your farm is to be primarily student-run, with production and garden immersion as main goals (that is, no formal education program), develop a business plan and budget that reflects those goals. For example, at a bare minimum you may have to purchase tools, compost, and seeds, and possibly pay someone part time to maintain grounds or serve as a point person or coordinator for student gardeners. In this case a business plan might be as simple as asking the

university or a private foundation for start-up funds to do those things for one to two years, with no further commitments on either side, which would then provide enough infrastructure to grow enough crops to sell at a farm stand or market, or to host social fundraiser events at the garden, which would then cover the project's expenses.

If your organization's goals are more involved, they will necessarily involve more skilled personnel and more planning. The business plan and budget should reflect these needs. *Consult farmers* for estimates of time required for start-up and development, as well as duties necessary to accomplish stated goals. Consult education specialists for time required to accomplish educational programming goals. Consult other student farms (see NewFarm directory: www.newfarm.org/depts/student-farm/index.shtml) for their stories and experiences unique to student farms, and their recommendations.

The lion's share of start-up funds for the SOF came from the Kellogg Foundation, as funding for constructing hoophouses, purchasing equipment, and paying personnel to start the farm and carry out season extension research expanded from the baby salad winter production research. It's hard to look $95,000 in the face and say it was a bad idea; the funding itself was a blessing. It allowed us to do most of what we've done' it paid for me to be here. However, for this group of people at this stage in development, *tying* the farm's development to one person's research program has presented several challenges. If that person (John) or his research technician (Melissa) suddenly dropped out of the picture, the farm would be unable to meet its obligations to generate research as set forth in the grant. If the time required by the research program is greater than expected in the proposal, that necessary time comes out of organizational development time, since planning can always be postponed to address short term needs (Bridget Behe,

personal communication). While most of us involved in starting the farm are interested in and supportive of the season extension research (and will benefit from the results), we've realized that we're understaffed to do reliable research or develop a successful CSA or education program of any quality *and* still get some sleep at night, at our current level of organization and personnel.

Start identifying possible funding sources as early as possible. Constantly be on the lookout for new funds and possible collaborations. In fact, it's ideal to have a development director, as in many nonprofit organizations, but barring that, a faculty advisor experienced in writing grants is invaluable. There is also great educational potential in grant-writing; students interested in development and nonprofit work can be recruited to help secure funds for the farm as well as develop their own grant writing skills and portfolios. Determine what conditions accompany each option. Establish a clear budget as possible, itemized by expenses, ideally guided by the process described in *Whole Farm Planning* (Henderson, 2004), before deciding which funding sources to solicit. Use the set of core values determined by the key players in the organization to determine if a funding option fits the ideals and needs of the farm. Be clear about any activities tied to that funding, and how those activities will complement or compete for time needed for farm development and operation. At every step of the process, ask if the group's core values are guiding the decision and if the outcome will help further the mission by funding the goals and objectives. I recommend against identifying funding sources, then trying to bend the farm's activities, or even worse, goals, to conform to the stipulations of any one source.

Use Resources At Hand! Human, physical, financial, intellectual

A university is rich in human and physical resources, but can be difficult, especially for students and new employees, to navigate. Try to document all facilities, people, organizations, equipment, events, and other university infrastructure that might be useful to the farm. This is akin to the HM practice of "assessing the whole." Solicit input from faculty from any related department (or apparently unrelated; for example, through CSA, we've developed a good relationship with a journalism professor, and a communications professor, and subsequently their students and families. One of them currently edits our newsletter, and we're discussing possible collaboration on interpretive materials. The possibilities for collaboration on many levels are endless.). Don't feel pressure to use all the resources available; many, particularly at agricultural research institutes, will be overkill for what a student farm wants to do. For example, we have the use of an automatic seeder for Blackmore plug trays. For a large scale farm, or transplant production facility, this machine could prove essential. It's intended for large scale production. For the volume of transplants that we use, the time and attention required to set up the machine for each seed type group is usually not worth it for me personally. I happen to value peace and meditative work, and that machine is loud and irritating. If I were a transplant producer, I'd probably feel otherwise. Except for a few crops like onions, where our volume actually can take advantage of the machine, we have tended to value the human interaction with the seeds and with each other while sowing trays over the time saving sometimes afforded by the machine. If you truly start simply, labor-saving devices will make their way into the farm system as the need for them is identified, and you can incorporate them as needed. This is not to say that you shouldn't

take available equipment into consideration when designing a cropping system. For example, we use four foot wide beds because the tractor-drawn tiller that we borrow to work up beds is four feet wide. If we decide to purchase our own tiller or similar device (spader, for example), we may adjust our cropping system to make best use of our equipment. Consult other farmers and literature for practical options to consider, then find out what's available to borrow, and eventually to purchase, and design cropping systems accordingly.

Identify contact people, contact info, dates of events, etc. and how those may impact farm operations or decision making. For example, find out when exams are, and try to schedule major farm events (plantings, harvests, etc) around them, even if it means adopting a slightly different schedule than a non-student farm. Find out when key people are likely to be out of town (e.g. professional meetings, trade shows, etc), and schedule major meetings around those dates. Find out when lendable equipment is and is not available, how to transport it, who can operate it, etc. and plan major equipment uses accordingly (e.g. we use Hort Farm tractors for bed prep in the spring, but if their tractor and tillers are in use when we need to prep beds, we could adjust our schedules accordingly). This is a survival tool for the transition stage of development, before acquiring equipment for the student farm, while figuring out what equipment makes sense to acquire, and which is best to continue to borrow.

<u>Take advantage of the unique social and financial characteristics of CSA</u>

If a student farm is intended to be anything beyond an immersion gardening experience for students, I highly recommend CSA as a business model. Start with a trial

growing year, then move to a farm stand, participate in a farmers' market, and/or sell some wholesale produce, with an eye to eventually becoming entirely or partly a CSA farm. Besides providing the experience of a production farm, CSA requires interaction with consumers, members. It provides endless opportunity for lessons and discussions of entrepreneurialism, economics, food safety, organic production and certification, diet and nutrition, income disparity, and food systems, to name just a few. The list is endless. And that's just the educational benefits of CSA. As a business model, it affords a farm a particular kind of economic and social relationship with consumers not found in any other model. Farmers and members step outside the common, simplistic rolls of producer and consumer, and engage in a mutually beneficial relationship where both share the burden and the risk of farming. See *Sharing the Harvest* for an extensive discussion of social and economic benefits afforded a farm by CSA.

Remain Flexible and Keep the Faith!

"Never doubt that a small group of thoughtful, committed citizens can change the world. Indeed, it is the only thing that ever has." –Margaret Meade

2. RECOMMENDATIONS FOR FURTHER STUDENT FARM RELATED RESEARCH

What kind of research is possible on and around student farms?

To quantify the options for research on a student farm sound onerous, if not impossible. They are endless. However, as a tool for securing continued funding for student farms as part of a broader organic and sustainable research thrust, an exhaustive list of potential topics and beneficiaries would be useful, not only in generating interest on the part of funders, but on the part of researchers who aren't accustomed to thinking "outside the box."

I also propose, perhaps as a simpler starting point, a quantitative comparison, if possible, of time and resources necessary to accomplish different ends on a farm. For example, if a student farm's goal is "year round production," but the mission is to educate students about farming systems, not just to grow food in the winter, evaluate the time and resources necessary to achieve that goal under the educational mission setting and under the production mission setting. Since so little published literature exists about student farming, very basic studies like this can help set the stage for more philosophical work.

Much work has been done on the physical components of farming, even on sustainable or ecological agriculture, and some work has even been done on winter production methods. Much work has been done on experiential education, student-directed learning, and group process. Work has been done on the social and ethnographic aspect of farming and rural sociology. However, student farms provide a platform for integrating any or all of those fields, and even for creating emergent fields unique to student farms. For example, ecological agriculture educators would all benefit from a better understanding of how people learn in hands-on environments, and how they can use that knowledge to design teaching farms to better teach both agroecological concepts and farming practices. I think epistemological investigation into the different *kinds* of

learning that happen for students in different capacities at student farms would allow ag educators to deliberately use student participation at existing teaching farms to meet specific educational goals.

"Program Farming"

On evolving a culture of "program farming" or institutionalized farming, or non-profit farming:

Sustainable small-scale farming as I understand it, on a gut level, at a gestalt level, is based on the legacy of *family farming* as described by Strange (1988). By family farming, I mean a farm paradigm in which the farm is an integral part of the family, and the family an integral part of the farm. The land belongs to the family, and the family quite literally belongs to the land. From the family farm structure comes a farming ethic, which is inherent and integral to the successful family farm. That is an ethic of personal investment, personal relationship, personal continuity, with the farm, an understanding, whether explicit or subtle. In a family farm paradigm, any work the farmers do for the farm, they do for themselves, as the farm is part of the family structure, physical, economical, social, legacy-wise, etc. Any sweat equity that goes into the farm goes back to the family, whether the current family in time, or their descendents. From an anthropological viewpoint, it's a survival tool, and benefits one's family, perhaps both directly *and* indirectly. It's kind of a no-brainer when you consider a land-based culture, an agrarian culture, where generations of same family stay on same land. There's a

social and economic, as well as land quality, ratcheting effect for every generation of good stewardship and good hard work.

Good hard work and *good* stewardship are the key words there, and I want to make the point that good work is usually hard work, and on a farm usually involves immediate personal sacrifice, if one considers comfort, relaxation, entertainment, sleep, etc. necessary, and something that one does not want to give up for the sake of farm work. The payback comes, and this is the point, later, whether to one's self or one's descendents, it comes. That's the nature of sweat equity. Personal investment equals farm gain equals personal gain, at some point in time. And good stewardship is absolutely important from the ecological perspective. Successful farm operation is a very personal system – it relies on personal investment, personal imperative, personal conviction of the farmer(s), a personal relationship with the land, that has evolved over time. And traditionally, the farmer benefits personally.

In institutionalized farms, however ecologically sustainable, the farm's well-being and successful operation still depends very much on the farmers' *personal* commitment to good stewardship and good work, but the land does not belong to the farmer, and the farmer does not belong to the land. That's the critical difference between family farming and program farming. The intimate relationship between farmer and land is still necessary to the well-functioning of the "sustainable" (ecologically, and probably even economically) small program farm, because as the old proverb goes, "the best fertilizer is the farmer's footsteps," but usually what a farmer takes away from that relationship is a savings account (if they're fortunate), not a farm. And it's hard to put a dollar value on

what's missing from that relationship to evaluate whether the farmer is being fairly compensated.

Program farming also changes the relationship of the farm to its local community. Since the humans associated with the farm are not tied to the land, their relationship to local people, perhaps program farmers themselves, is skewed in a way that potentially changes farming communities, at least for the less stable, if not for the worse.

So we need a new paradigm in order for "program farming" to be able to be truly sustainable. In its current incarnation (in my experience), program farming draws heavily on relics of family farming still perceived to be inherent to farming – personal sacrifice, sweat "equity" (though the equity part is left out, when considered on an individual level), a work ethic that evolved in that personal relationship between farmers and land (and more…). The paybacks have to be, and are, different from those of family farming, and need to adequately "pay back" the people and the land involved in the program, because those two players have a very different relationship than they do in traditional family farming. The benefits realized by program farming are different from those realized by family farming, and are reaped by different players. The "sources" and "sinks" of materials and energy flowing through the system are different from those on the traditional family farm. I think an investigation into the flow of energy, both physical and psychic, and materials on a program farm and a traditional family farm is in order. After that, or perhaps concurrently, it becomes necessary to attempt to perform an economic analysis of the pieces of the farmer-farm relationship, in order to evaluate whether farmers and communities surrounding such farms are being adequately

compensated and serviced. And finally, I propose an examination of the effects of program farming on the character and stability of rural communities and rural sociology.

CONCLUSIONS

According to the Rodale Institute, two million acres of land in the U.S. were devoted to organic farming in 2001. By the end of 2003, that figure rose to 3.7 million acres, with approximately 12,200 certified organic farmers. The institute believes there will be 100,000 certified organic U.S. farmers by the year 2013, or 5 percent of the two million American farmers. This segment of the agricultural population is currently underserved by our land grant institutions and research. In 2001, only 0.02 percent of field plots and research lands in the US were certified organic (Sooby, 2003), or one hundred times less than the then 0.2 percent of total certified organic US crop land (Duram, 2005). The total acreage dedicated to organic research in the U.S. land grant system has more than doubled between 2001 and 2003 (0.13%, up from 0.07% in 2001), but it's not keeping pace with the growth of commercial certified organic acreage, which is 0.3-2% of US farmland, depending on crop type (Sooby 2003).. There is no doubt that organic research and training is necessary and growing in demand. The SOF and similar farms can play a critical role in filling those niches, but special care needs to be given to do it sustainably, to "walk the walk" while furthering the organic and sustainable farming and living movement.

Farming is a skilled trade, an art, requiring full time physical labor, experience, an intimate relationship with a place, organizing skills, communication skills, land, physical resources, decision making ability and power, and good business sense. *Teaching* farming is a distinct but similar skilled trade and art, requiring farm experience, teaching experience, and passion for passing on skills. Here at the SOF, we have no experienced farmers. I was the closest thing at the beginning, after Beverly (the one student farmer who grew up on a farm) graduated. But we do have lots of energy, enthusiasm, bodies. What we've undertaken so far requires an experienced, full time farmer and farming teacher. Our current challenges are re-evaluating the appropriateness of the undertakings, and identifying how to bridge that gap between needs and resources. A lot of what we've "learned" is not new information; it was personal development because we as a group of individuals were inexperienced at the tasks at hand. It's important to identify what new information a student farm can actually generate as a research project, concurrent with any other agendas, like producing food for a CSA, or offering students specific training in particular skills.

I didn't come here with the intention of studying or promoting education theory. I came to share my love and limited experience of farming with others, particularly undergraduate students. I didn't see a need to "programmatize" the farm. Farming itself was educational, and paying attention, or mindfulness, the best teacher. Each of us learns what we're ready for, when we're ready to learn it. I'd forgotten about the very structured and regimented living and learning environments that make up the university, and the level of overcommitment and distraction that characterizes university life. I now see that I was asking the students, everyone involved really, to switch gears, "cold

turkey," and have enough self-awareness, discipline, mindfulness to truly engage with that unstructured, immersion style of learning.

As an organization that purports to embrace *diversity* and *experiential learning* (two of our stated goals), not to mention the overarching principle of *sustainability*, we are charged with *embracing* those divergent experiences and expectations that everyone brings to the table, *engaging* everyone in critical planning that includes non-judgmental consideration of all options, *implementing* the resulting plan, and taking time for *reflection, evaluation, and recommendation* for improvements in the future. In short, if we want to truly avail ourselves of the resources and situation at hand, we need to be more than a production-oriented farm or a research project or a student organization. We need to remember to place emphasis on those steps in experiential learning put forth by Kolb (1984), and to set aside time for them, beyond the time required to grow food and steward the land. That means necessarily allocating personnel, and hence funding, to facilitate that dedicated time for high caliber experiential learning.

Cornel West, Professor of Religion and African American Studies at Princeton University, once said in a speech commemorating the teachings of Dr. Martin Luther King, Jr., that to *teach* is to meet someone where *they* are, not where you are (West, 1998). Moving toward a more programmed, structured system in the name of education meets student farmers where most of them are. I think the best next steps for the SOF are already in motion, the development of a teaching program, with its roots in our student-driven history, and its future drawing from our unique winter production system and from established programs at schools like UC-Santa Cruz, North Carolina State, Central Carolina Commuity College, and UC-Davis. By instituting the Kolb's four-part

experiential education theory, and standardizing parts of the student experience at the farm, we can provide an environment in which they can personalize their own learning at a level they're ready for. This programming approach reduces the responsibility for production, as well as self-directed learning, on the part of students, by orchestrating a learning system of which crop production is only one part, and used deliberately as a tool for education rather than as an end in itself.

The scholarly opportunities presented by the SOF have barely been tapped. Damian Parr, in his master's thesis at UC-Davis in 2003, conducted an ethnographic study of the people involved in the student farm on campus. While continuing work on the natural science and production methodologies is of course important to the land grant institute mission, ethnographic and epistemological work, I believe, is the cutting edge in ecological agriculture education research. Like Francis et al. (2001), I think that the next steps in designing ecological agriculture education are to deliberately blend social and natural science methodology, adopt a learning systems approach (e.g. Bawden, 1994) as opposed to components approach, and to acknowledge the blurry line between teachers and learners. Perhaps by institutionalizing these concepts, we'll bring the institution and the individuals involved closer to being able to truly engage in a less-structured, self-directed and mindful learning environment.

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