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## **Student and New Farmer Education to Support the Growth of Organic Farming**

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### **Introduction**

This presentation is part of a 2-day USDA conference exploring opportunities and challenges facing organic agriculture. The purpose of the Education Session of the conference was to consider broadening the education infrastructure in organic agriculture. This student-oriented presentation: (i) describes student audiences to be addressed; (ii) outlines an example of curricular content for organic farming; (iii) identifies established K-12 student-based gardening and farming education programs that would benefit from organic farming content; (iv) identifies several current sources of organic farming information; and (v) addresses university student farming programs in general and the Michigan State University Student Organic Farm (MSU-SOF) year-round community supported agriculture program in detail.

### **Developing Curriculum: Who is the Audience?**

When considering the education of future generations of organic farmers, a good place to start is with recognizing that for several decades, experienced farmers have provided organic agriculture training to new farmers. The farmer-to-farmer organic training has occurred generally in the absence of the land grant universities or governmental support, and at times, in the face of active criticism from agricultural educators and leaders. For me personally, as a relative newcomer to both farming and organic farming, it was and is important to be aware of and respectful of the early organic educators. One of the key reasons I am involved in organic farming education is because of my first experience at the 1998 Upper Midwest Organic Farming Conference in Wisconsin. I experienced over 1,000 registered participants that were very motivated learners. The presenters were doing the best they could, but at times without a foundation of basic biological or physical principles and without monetary resources to prepare visuals or handouts. I love to teach and here was an eager audience. To prepare I had to experience and understand the basic principles of organic farming by visiting farms, learning from organic farmers, reading, and practicing organic farming myself.

A second important point is that there are at least two distinctly different audiences that need information about organic farming. In one case, there are established farmers that know how to farm and want to know how to farm organically. An example from personal experience is the Great Lakes Fruit and Vegetable Expo held annually in Grand Rapids, Michigan. This education and trade show has over 3,000 registered participants. The first two days of the show contain a lot of information about what and when to spray for weeds, insects, and diseases. Those who stay around to attend the last day of organic sessions are mostly conventional farmers wanting to find out just

what organic is all about. We started by presenting a soils component and a marketing component, then adding some weed management. We focused more on the soil quality and living soil component including aspects of transitioning to organic, and then letting successful organic farmers talk about what they do and why it works.

A second audience that wants to learn about organic farming is the young or new farmers that are both learning to farm and how to farm organically at the same time. It makes sense to me to include K-12 youth that are the farmers of the future in this group. Many of the new farmers may be those seeking a second career in farming or farming related activities. With the inexperienced farmer audience, the goal is to provide a strong foundation of information and examples that will help them to avoid common misunderstandings and expensive learning experiences. It is also important to recognize the importance of scale, the required investment in equipment as scale increases, and that starting small-scale is helpful for new farmers. Scale is also often related to diversification, with small-scale farms possibly having a high degree of crop diversification. Learning about and experiencing the dozens of vegetable, fruit, herbs, and flowers of the successful market garden does not require but a few of each.

### **Developing Curriculum: What is Organic Farming?**

When I ask the question "What does organic mean to you?" or "What does it mean if I say food was grown organically?", the most common answer from students or adults that know little about organic farming is that it was grown without chemicals, fertilizers, or pesticides. So step one is to explain that organic farmers do use some chemicals, fertilizers, and pesticides, but that the principles are to minimize the use of these and to only use certain types which are acceptable under a set of rules or guidelines that evolved over time and that organic farmers support. This might include an explanation of the start of the farmer developed organic certification and the more recent USDA National Organic Program (see Appendix: Author's List of Related Links). It might also include an explanation of things that are not allowed such as genetically modified organisms (GMOs), irradiation of food, and confined animal feeding operations (CAFOs).

We quickly follow this discussion with explaining that if we ask the same question (What does organic mean?) to organic farmers or people that know about organic farming, the most frequent answer by far is that organic farming is about the "living soil" or the "soil food web" or protecting soil health as the foundation for healthy crops, healthy animals, and healthy people. From protecting the soil and its biological diversity the discussion can lead to many topics including the importance of crop rotations, crop and animal diversity, and feeding the soil. We often hold up the double handful of soil and point out that a cup of soil can be home to as many microorganisms as there are people on the planet — 6 to 7 billion. We talk about "microbe manure" and the soil food web with bacteria and fungi as the primary feeders. This usually includes the reminder of all the antibiotic drugs and cleaning agents and the potential negative impact as well as evidence indicating that soil fungi are some of the first to go in response to excess cultivation, fertilization, and pesticide applications. We can even explain how a bacteria with a carbon to nitrogen (C:N) ratio of 5:1 can be eaten by an organism with a higher 15:1 C:N ratio resulting in the release or excretion of nitrogen that plants use to grow.

Things like green manures, compost, and minimizing cultivation, fertilizer, and pesticides all start to make perfect sense in light of the soil food web. So does the idea of microbe manure and humus as the glue that holds the soil in place and helps prevent erosion. Most are surprised when told that the

annual amount of soil washing and blowing from the United States alone is enough to fill train cars loaded to the legal limit that would wrap seven times around the globe. We point out how we grow 40 to 50 different crops and that crop diversity provides us with a type of crop insurance as the annual weather pattern changes from cooler to hotter years or from dryer to wetter years, and protection in case of crop loss due to insect or disease damage.

From here we go onto things that are not part of the NOP, like local food, direct marketing, how little of the food dollar gets back to the average farm, the impact of farm products on the local economy, how far the average meal in the US travels from field to fork (~1500 miles), and the high fossil fuel input and transportation subsidies that allow our current food system to continue. We spend time describing our MSU year-round local farming with unheated greenhouses and cold storage as a possible solution to the situation. Most of the students have not heard of community-supported agriculture (CSA) marketing yet. CSA goes beyond the NOP and gets to the bottom line of connecting people to their food including the farmers who grow it and the land where it is grown.

Another common way to outline the principles of organic curriculum to farmers is to use the organic farm plan template (see ATTRA in Appendix, ) that many certifying agencies now use. The farm plan requests information in the key areas of site layout, field history, seeds and seed treatment, sources of seedlings and planting stock, soil and crop fertility management including compost and manure, natural resources protection, crop management including pest management, maintenance of organic integrity, post harvest handling and storage, and record keeping. Teaching from the farm plan benefits both transitioning and new farmers.

### **Established Youth (Student) Farming and Gardening Educational Programs**

A brief review of existing youth programs that already have a proven track record of impact seems essential to insure that age-appropriate information about organic gardening and farming methods are available to help prepare the organic farmers of the future. I noticed the USDA "for kids" site had lots of neat stuff but could use an "organic farming" icon.

How many people currently in farming or some aspect of agriculture are there because of the 4H program? (see Appendix). Showing animals or exhibiting crops at the county fair, learning about natural resources, experiencing food processing and preparation are just some of the curriculum areas of 4H clubs around the country. The four Hs of Head (mental), Hands (physical), Heart (emotional), and Health (spiritual) are at the foundation of any holistic approach including organic farming. Are 4H programs getting necessary information about organic farming? A MSU colleague who is a statewide 4H horticulture program coordinator says no. She also reminded me that one of the still valid reasons for starting 4H was to provide children information to take home to mom and dad. I think she is also now looking at how to integrate organic curriculum into 4H. I would guess there are others trying also.

The National FFA Organization (formerly Future Farmers of America, see Appendix) is another important part of the exposure of youth to agriculture. Are organizations that support FFA, like the Farm Bureau, supportive of organic farming curriculum in the FFA? Are organic farming and pastured animal production being taught? I know of examples in Michigan where pastured animal livestock are being raised by high school students. High school agriscience teachers are mostly prepared to be teachers and have limited crop or livestock experience unless they grew up with it. They need support and curriculum materials. I presented a one-day workshop

this summer for 30 agriscience teachers at the MSU-SOF and they were interested to learn about organic and year-round vegetable farming. Here is another place where funding could go a long way to helping youth learn about organic farming.

The Junior Master Gardener program (see Appendix) is newer but rapidly growing program introducing urban youth to gardening and growing plants. My experience with adult Master Gardeners is that they are looking for organic gardening information that mostly is not there yet, not due to a lack of desire but more due to a lack of resources for development.

Elementary and middle school gardening programs are a fourth place where organic gardening and farming information can have a large impact. School gardening programs seem to readily accept the logic of not using pesticides and using compost. In addition to growing their own food, students get the opportunity to prepare and enjoy the leaves and fruits of their efforts in many school garden programs. The Edible School Yard program in California is perhaps one of the best known projects (see Appendix). As part of an NCSARE funded project, we built a solar greenhouse at a school near MSU and with the help of a graduate student, K-5 students grew and harvested organic salad greens throughout the academic year. Teachers are inundated with new curricula. The goal is to use gardening to help teach the mandated curriculum and to get volunteers to establish and manage the organic gardens.

Examples of regional programs focused on youth include The Food Project in Boston and Growing Power in Milwaukee (see Appendix). These two programs incorporate organic farming principles and are successful models for those interested in involving youth (students) in food and farming programs.

### **Established Sustainable and Organic Farming Information Sources**

Over the past decade educational materials for organic farmers have increased tremendously. Examples (see Appendix) include publications from The National Sustainable Agriculture Information Service (ATTRA), The Sustainable Agriculture Research and Education Service (SARE), the Alternative Farming Systems Information Center (AFSIC), Organic Agriculture Information, The Organic Farming Research Foundation, The NEWFARM — Rodale Publications electronic publication, and the NOFA Organic Principles and Practices Handbook Series. Regional organizations such as The Midwest Organic and Sustainable Education Services — MOSES/ *Organic University* and Northeast Organic Network — NEON and farmer training efforts such as CRAFT (Collaborative Regional Alliance for Farmer Training), The Center for Agroecology and Sustainable Food Systems (CASFS), and Growing Growers, are helping both to define, prepare, and present many aspects of an organic farming curriculum (see Appendix). In addition there are a number of state, regional, and national organic and small farm conferences which farmers attend and over time are also defining the organic farming curriculum. The amount of money invested in these programs pales in comparison to some other programs, say like genetic modification of organisms, but the demonstrated impact is great.

In recent years, the UC Santa Cruz Center for Agroecology and Sustainable Food Systems had taken a leading role in making curriculum materials for sustainable agriculture, organic farming, and direct marketing methods available online or at a low cost for printed materials. The American Society of Horticulture Science (ASHS) Organic Farming working group hosted a workshop in July 2005 on developing organic curriculum and ten schools presented their existing or developing programs. Proceedings of the workshop with reports from each school will be published in HortTechnology

(2006). The UC Davis College of Agriculture and Environmental Sciences & Student Farm and the UC Santa Cruz Center for Agroecology and Sustainable Food Systems are jointly convening a national sustainable agriculture education conference, January 24–25, 2006. Details are available at [zyx.ucsc.edu/casfs](http://zyx.ucsc.edu/casfs). The focus is sustainable including organic curriculum. We are making progress.

These are just a few examples of programs that are currently providing or developing information to support organic farmers and markets. There are many other important periodical publications and many state, regional, or national organic farmer conferences. Supporting and growing these existing programs can greatly increase the availability of information and amount of impact in a short time frame.

### Organic Farming at Community Colleges and Universities

Regardless of what method of agriculture, some agricultural educational goals are common at the college or university level. To develop a strong foundation of knowledge we want to:

- (i) Balance two key concept areas — how plants/animals grow and how to grow plants/animals — since most agree with the L. H. Bailey premise that "if you teach a farmer why, they will figure out how";
- (ii) Describe the impact of weather and environmental conditions on plant or animal growth particularly as it relates to soil type (the importance of place);
- (iii) Help students learn concepts of plant health and to learn to identify, anticipate, and manage key plant/animal pests and diseases for the geographic location. In organic agriculture, we are trying to establish an understanding not based on the enemy to eliminate, but an understanding that there are many herbivores, decomposers, or parasites and they are just doing an ecological role — and we need to minimize any negative impact on overall farm productivity;
- (iv) Describe the relationship between inputs/costs and product value/marketing and how to make the desired amount of net income. The emphasis here is less on cash profit and more on the triple bottom line of sustainability and holistic management; and
- (v) Provide historical perspective and information about people including something about culture and food — "why are we here?" including some history of our current "make food cheap" policy.

**Experiential Education.** You can only learn so much in a classroom setting. Students of all ages enjoy active learning or experiential education and learn and remember more when they do something. At the collegiate level, students pay X dollars (>\$200 at MSU) for one credit of lecture time (often 50 minutes per week for 15 weeks) and they pay the same X dollars for one credit of lab time with is usually 2 to 3 hours of contact time. My experience in 20 years of teaching is that students like labs better and they report learning more in labs. Teaching labs is clearly more difficult and expensive because class size is often limited to 30 or less versus hundreds in a lecture hall. Yet we don't seem to consider charging more for labs and giving the students what they want?

As we have been reminded during the 150th anniversary of MSU, many land grant university farms were initially built and staffed by students. In the late 1970s, a new group of students started asking for a chance to farm on campus. This new group wanted to farm organically. Student farms were started at University of California Santa Cruz, UC Davis, and a few other



schools. There was another group of campus/student farms that started through the 1990s and the trend continued to grow with a big spurt of new farms in the last few years. The Rodale Publishing NewFarm has posted a list of, and, where available, websites for over 50 student farms in 25 states (see Appendix) where students and the farmers of the future from a wide variety of majors and curricula are seeking small-scale, organic, and community-oriented farming opportunities. The farms have been student-driven and have often not been supported. The support needs to be there now. Just a generation or two ago, many students came to campus from farms. Today very few know anything about farming or what happens on a farm. Many college students are eager to learn about farming.

One of the ways I like to promote the student farm and experiential education is by reminding people of the vision and a task link. The quotation (author unknown) goes: "A vision without a task is a dream. A task without a vision is drudgery. A vision and a task are the hope of the world." Students want and need the balance of a vision and a task. When lecture concepts are balanced with a chance to apply them or to see them in action, students are more motivated learners. Rather than a snapshot in time, an active farm where students can participate on a regular basis provides a never-ending action story where students are the story.

**MSU Student Organic Farm.** Before starting the MSU-SOF, we looked carefully at the existing student farms to determine what was working and what was not. That information and some grant funding helped us get off to a very quick start. The MSU-SOF is a certified organic, 10-acre site with 14,000 square feet of greenhouse space and 7 acres of cultivated plots used for research of year-round diversified vegetable production, operation of a 48-week, 50-membership CSA, and outreach for small-scale farming (see Appendix). Our students started asking for information about organic farming and for the chance to grow crops on campus in 1999. We combined methods of community-supported agriculture with research on winter salad greens production in unheated/solar greenhouses and in 2002 made a proposal to the W.K. Kellogg Foundation to start a 48-week CSA organic farm run by students. We started building more greenhouses that fall, planted our first crops in February of 2003 and had 25 memberships filled by April (one week after offering memberships by email).

One of the challenges with teaching farming at the University level is that most of it happens when school is not in session. What we proposed in our USDA Higher Education Challenge Grant Program (2003) and have since demonstrated is that with the use of unheated/solar greenhouses (also called hightunnels or hoopouses), farming principles can be taught and practiced during the academic year. Students prepared soil and sowed seeds in early September and harvested a range of leafy green vegetables like baby leaf salad mix and spinach, as well as radishes and turnips through the fall season, including taking salad greens home for Thanksgiving dinner. For the spring semester, students sowed seeds in early February and also were able to harvest a range of vegetables before the end of the semester in early May. We were able to address all of the topics mentioned in the opening discussion of "What is Organic?" plus topics such as what food is available in the dormitory/campus food system and why.

We started developing curriculum by inviting instructors of existing classes to bring their students to come and visit the farm for an hour or two. We have several standard presentations including: (i) the "What is Organic?" outlined earlier; (ii) "The Living Soil and the Soil Food Web," including compost production; (iii) "What is community supported agriculture?" and the importance of supporting local food and farms; and (iv) "The Winter Greenhouse" and how we use unheated /solar greenhouses to harvest fresh vegetables in the winter. During farm visits we also try to get students to do

something like planting garlic or harvesting potatoes. Based on surveys completed after the visit, they remember the key concepts and like doing something.

Once we demonstrated student interest and a successful year-round production and CSA marketing program generating over \$50,000 in produce sales, we developed a proposal for courses. Details of the proposed courses are available at [www.msuorganicfarm.com](http://www.msuorganicfarm.com). We have proposed 40 credits (approximately \$10,000 at \$250/credit) over 16 months. The focus will be hands-on growing and operation of a diversified community supported farm. Students would take at least 9 credits of course work fall and spring semester and a 3 credit practicum class designed for students to learn by assisting with the day-to-day operation of the MSU-SOF. The summer and second fall sessions will include MSU-SOF experience focused on field production of vegetables, fruit, herbs, and cutflowers, a "Study Afarm" class to provide field trips to organic farms, and the opportunity for a specific focus area selected by the student. Development of the courses is primarily funded by MSU and the USDA-CSREES Organic Transitions Program.

An important trait of our program and courses (Table 1) is that we have designed them to serve several audiences. Some of the for-credit courses are being developed from materials first used for farmer training workshops and the *Organic University*. We will be developing additional courses that will first be offered on campus for credit but will then be offered to farmers. The same courses will also be available to certificate program students and bachelor degree students. By packaging the information in smaller units, it is easier to present to farmers in either a two day workshop or an online format. We are following the lesson we learned from organic farmers, get as much as you can from monetary and human capital investment. There is definitely room for much more information, but we also have to keep the program financially within reach.

Table 1. Summary of courses being developed for the 16-month, year-round organic horticulture certificate program starting at Michigan State University in September 2006.

|                                   |   |
|-----------------------------------|---|
| <b>Organic farming courses</b>    | (7 1-credit courses)<br>Organic Farming Principles and Practices<br>Organic Soil Fertility Management<br>Compost Production and Use<br>Organic Solutions for Crop Competition<br>Organic Solutions for Plant Health<br>Organic Produce Direct Marketing<br>Organic Produce Wholesale Marketing  |
| <b>Horticulture crops courses</b> | (8 courses, 15 credits)<br>Plant Science (2 credits)<br>Vegetable Production and Management (3)<br>Fruit Production and Management (3)<br>Greenhouse Structures and Operation (3)<br>Passive Solar Greenhouse Crop Production (1)<br>Organic Transplant Production (1)<br>Specialty Cut Flowers (1)<br>Culinary and Medicinal Herbs (1) |
| <b>On-farm courses</b>            | (6 courses, 18 credits)<br>SOF Practicum Fall (3)<br>SOF Practicum Spring (3)<br>SOF Practicum Summer (3)<br>AgTech Placement Training (3)<br>Independent Study (3)<br>Study Afarm (3) (Field Trip Course)  |

### Summary of Recommendations

- USDA can work with and financially support existing organic farming organizations so these organizations are able to (a) contribute to student based programs at many levels and (b) work cooperatively with educational institutions towards the continued growth of a detailed national organic curriculum.
- Perhaps the best way to help anyone really understand organic farming and consider the option that organic is more than a niche market is to take them to successful organic farms for in-depth visits.
- USDA can support and facilitate development of age- and skill-appropriate organic curriculum or necessary information for existing youth-oriented farm and garden education programs like 4H, FFA, and Junior Master Gardener.
- Help elementary, middle, and high school students by supporting efforts to demonstrate how organic school gardening and farming can help teachers make the mandated curriculum exciting and connected to student's daily lives and diets.
- USDA can continue to encourage land grant universities to create physical spaces for experiential education and curricular opportunities for all students to explore and investigate organic production and marketing methods, including the impact of local food on local economies and homeland security. Funding full-time farm manager and academic specialist or instructor positions appears to be an important first step.



- There clearly is room for regional cooperation, distance, and internet learning methods, and possible tuition reciprocity in the area of organic farming until demand dictates that each university develop a program.
- Non agriculture colleges and community colleges can also be supported to provide experiential connections to farming and the food system.

### Closing Thoughts

The urgency around student-based organic farming education is likely not just about teaching organic, ecological, or sustainable farming principles. The urgency is more about connecting people of all ages with their food, farmers, and the land. As a horticulturalist, I have come to see that the important food system issues at the moment are less horticultural and more social. However, I can use what I know — horticulture — to help people experience the connections. People get excited about flowers, vegetables, and fruit and about farm animals. The year-round CSA farm is one exciting model of how a large number of people can be connected to farmers and the land and at the same time keep farmers on the land to protect and develop our natural resources.

The shift to organic agriculture starts with developing an understanding of interconnectedness. The garden or the farm is a great place to experience principles of interconnectedness, a willingness to accept that which we should not control, the beauty of simple things in life, and the cycles of growth and decay (life and death). We cannot teach important life lessons through the use of poisons to kill unwanted pests, the unsustainable use of energy to satisfy our desires in the easiest and fastest way, the genetic modification of living organisms, the confinement of animals in crowded feeding operations, the creation of the illusion of low cost by ignoring true costs, and by the manipulation of our fellow human beings to live (farm) the way we live (farm) and not the way they choose to live (farm).

We have an exciting invitation before us that includes the opportunity to contribute to the further evolution of agriculture into a more holistic expression of humanity that frees and empowers people to grow the human spirit. Over the last century, organic agriculture movements have questioned the lack of wisdom and the absence of plans for long-term sustainability inherent in many of the agricultural technologies introduced with the false hopes of eliminating hunger. Agricultural methods have been widely imposed that are not consistent with any understanding of the roots or foundation of the evolution of the human spirit in the wholeness of life. The methods to alter the course of agriculture have been demonstrated by organic farmers and merely await our broader application. Some might question if Organic can feed the world. I do not. Regardless of what organic can do, it is clear the current methods will not work for the long term. Kenneth Wilbur, a philosopher and author that I have come to admire, points out that rarely are people wrong in regard to their ideas, but often they are working with incomplete information. We have the chance to be more thoughtful, caring, and complete.

## Appendix: Author's List of Related Links

4H

[4husa.org](http://4husa.org)

AFSIC — Alternative Farming Systems Information Center

[www.nal.usda.gov/afsic](http://www.nal.usda.gov/afsic)

ATTRA — National Sustainable Agriculture Information Service

[attra.org](http://attra.org)

CASFS — The Center for Agroecology and Sustainable Food Systems

[www.ucsc.edu/casfs](http://www.ucsc.edu/casfs)

CRAFT — Collaborative Regional Alliance for Farmer Training

[www.brookfieldfarm.org/craft.html](http://www.brookfieldfarm.org/craft.html)

Edible School Yard

[edibleschoolyard.org](http://edibleschoolyard.org)

The Food Project

[www.thefoodproject.org](http://www.thefoodproject.org)

FFA — The National FFA Organization

[ffa.org](http://ffa.org)

Growing Growers

[www.growinggrowers.org](http://www.growinggrowers.org)

Growing Power

[www.growingpower.org](http://www.growingpower.org)

Junior Master Gardener

[jmgkids.com](http://jmgkids.com)

MOSES/ *Organic University* – Midwest Organic & Sustainable Ed. Services

[www.moses.org](http://www.moses.org)

MSU Organic Farm

[www.msuorganicfarm.com](http://www.msuorganicfarm.com)

NewFarm from Rodale Publications

[www.newfarm.org](http://www.newfarm.org)

student farms list from NewFarm and Rodale Publishing

[www.newfarm.org/features/0104/studentfarms/directory.shtml](http://www.newfarm.org/features/0104/studentfarms/directory.shtml)

NEON — Northeast Organic Network

[www.neon.cornell.edu](http://www.neon.cornell.edu)

NOFA — Northeast Organic Farming Association

[www.nofa.org](http://www.nofa.org)

NOP — National Organic Program of the USDA

[www.ams.usda.gov/nop](http://www.ams.usda.gov/nop)

Organic Agriculture Information

[www.organicaginfo.org](http://www.organicaginfo.org)

Organic Farming Research Foundation

[www.ofrf.org](http://www.ofrf.org)

SARE — Sustainable Agriculture Research and Education Service

[www.sare.org](http://www.sare.org)

UC Santa Cruz Center for Agroecology and Sustainable Food Systems

[zzyx.ucsc.edu/casfs](http://zzyx.ucsc.edu/casfs)