

# Identifying Key Characteristics for Student Farm Successes through a National Delphi Study

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## Abstract

Sustainable agriculture education programs continue to increase nationwide with many inquiry-based educational activities occurring on student farms. Student farms are defined as associated with educational or college institutions that provide diverse, hands-on educational experiences in agriculture. While student farms provide multiple benefits primarily to students, few studies have examined successes, challenges and educational strategies for utilization of these farms. In an effort to fill these gaps, we surveyed student farm leaders including farm managers and associated faculty from 24 college and university student farm programs nationwide. We utilized a three-round, online modified Delphi survey to collectively gather and rank student farm leaders' perceptions of five key student farm characteristics including: 1) successful components for establishment and long-term management; 2) educational and outreach strategies for students and community; 3) challenges, issues and solutions; 4) funding resources and strategies; and 5) ideas for future educational and outreach activities. Results demonstrated the importance of having an experienced farm manager; diverse interdisciplinary educational strategies primarily for students and some for community and the need for strong institutional support. These findings are important both for newly established farms as well as those already developed as student farms are becoming an increasingly important tool for providing the experiential educational foundation to university-based sustainable agriculture education programs.

## Introduction

Driven by increasing student interest, a growing number of sustainable agriculture and related food system education programs have developed nationwide (Parr and Trexler, 2011). While sustainable agriculture education (SAE) programs may differ in name and emphasis, they share important characteristics including a multidisciplinary curriculum and a variety of experiential learning opportunities (Parr et al., 2007; Trexler et al., 2006). Moreover, many of the hands-on sustainable agriculture learning take place on student farms (Bettman, 2011; Sayre and Clark, 2011). While student farms may also differ in their emphasis and activities, they are defined as associated with educational institutions and providing students with diverse experiential learning opportunities across broad disciplinary areas of sustainable agriculture (Parr and Trexler, 2011). As SAE programs increase, so do the number of student farms. Sayre and Clark (2011) reported over 80 student farms associated with various colleges and universities nationwide. Moreover, student farms are attracting diverse students, many from non-agricultural backgrounds interested in learning sustainable food production methods outside the classroom (Feenstra et al., 2008; Markhart, 2006). A wide range of educational programs including apprenticeships, internships, workshops and beginning farmer-training programs are developed on student farms. Student farms are critical facilities training future producers and educating food-system leaders through diverse learning opportunities in sustainable agriculture production, marketing, research, community engagement and professional development (Parr and Trexler, 2011).

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Student farms provide the educational foundation of experiential learning for many SAE programs nationwide (Leis et al., 2011), yet there is a lack of research examining their challenges, successes and diverse educational strategies. Newly established student farms often struggle with a myriad of issues that could be avoided by learning from existing student farms. No formal network of communication exists for student farms nationwide although informal communication often occurs among student farm leaders. While the Sustainable Agriculture Education Association (SAEA, <http://sustainableaged.org/>) lists student farms nationally and some student farm leaders attend the associated biennial conference, no network exists for student farms to communicate on an ongoing basis. Research devoted to identifying educational and outreach activities, current challenges and successes among student farm leaders can serve as a vital resource to new student farms, as well as creating a dialogue among established farms.

At the same time as students are increasingly attracted to student farms, community interest in sustainable and local food production is also growing. Nationwide, various communities are establishing highly productive community gardens and are searching for sustainable agriculture educational resources (Teig et al., 2009). These community gardens provide numerous benefits to individuals in the form of increasing physical health, developing skills in planning, organization, team-building and financial management and providing a source of fresh food (Bradley and Baldwin, 2011; Draper and Freedman, 2010). While there is much enthusiasm for community gardens, they can suffer from a lack of resources and SAE materials among other challenges. Consequently, this can create a divide between a community gardens' need for up to date sustainable agriculture information and university-level research (Pawelek et al., 2009). While student farms focus primarily on SAE for students, they may lack focused community engagement activities outside of marketing opportunities. Student farms may not interact with community gardens at all, further deepening the divide between institutions and local initiatives. There is great potential; however, for student farms to increase engagement with surrounding community gardens that is mutually beneficial, enhancing sustainable agriculture information, innovative research and resource exchange among the institution, students and community. Some student farms are engaging with community in innovative ways, yet there is a lack of research and communication highlighting these efforts.

### **Purpose and Objectives**

The purpose of this study was to describe successful components, educational strategies and challenges of student farms from the perspective of national student farm leaders. Twenty-four student farms nationwide and their associated farm leaders, including both farm managers and administrative faculty, participated in this study. We used a Delphi survey methodology to

identify and collectively prioritize student farm leaders' perceptions of five key student farm characteristics, including:

1. Successful components for establishment and long-term management
2. Successful educational and outreach strategies for students and community members
3. Most significant student farm challenges, issues and their potential solutions
4. Current funding resources and strategies
5. Ideas for future educational and outreach activities

The major motivation for this study was to learn from other student farms and synthesize that information to help others avoid potential pitfalls that commonly affect student farm development and establishment. We also hope to encourage a new model for student farms that provide unique SAE for both students and community, which is why we included questions about educational strategies for both of these audiences in the study. Results from this study can be instrumental in identifying key components for successful day-to-day operations and long-term sustainability of student farms, as well as initiating a dialogue among student farm leaders nationwide.

## **Materials and Methods**

### **Delphi Study Design**

We used a Delphi technique to examine the experiences and perspectives from various student farm leaders across the country. The Delphi survey technique was most appropriate for this study because it allowed for the systematic collection, aggregation and consensus of informed perspectives from an expert group on specific questions and issues (McInturff, 2009). Because Delphi studies focus on a group of selected experts, the number of respondents is typically small, thus these studies are not intended to produce statistically comparable results (Okoli and Pawlowski, 2004). Experts participate in a number of sequential questionnaires that build off all the responses from the preceding questionnaires (Okoli and Pawlowski, 2004). This Delphi study involved three rounds of questioning through an online survey. The NCSU Institutional Review Board (IRB) for the Protection of Human Subjects in Research approved the survey March 2, 2012, prior to initial survey distribution to the participants.

### **Target Audience, Data Collection and Analysis**

We aimed to include a regional diversity of student farms from institutions throughout the country. We used the SAEA Student Farm Directory (<http://sustainableaged.org/projects/student-farms/>) and respective program websites to gather the list of associated leaders (farm managers, faculty/farm director or any institutional administrator). On March 27, 2012 we sent an e-mail invitation to student farm leaders from 34 student farms that were active on the SAEA Student Farm Directory, representing a diversity of private and public colleges, land-grant universities and community colleges span-

## Identifying Key Characteristics

**Table 1. Student farm program participants in Rounds 1-3 of Delphi study.**

Type of Institution	Number of Participating Programs	Number of States Represented Nationwide
Community college	1	1 (NC)
Liberal arts college	6	6 (AZ, KY, NC, OR, PA, VT)
Land-grant university	10	10 (CA, FL, GA, IA, ID, MI, NJ, NM, PA, SC)
Private research university	2	2 (CA, NC)
Public university (other)	5	4 (CA, MT, NC, WA)
Total Number of Participating Programs		Total Number of States Represented Nationwide
24		17

States with more than one participating student farm program (CA, PA, and NC).

response using a 1-5 Likert-type scale (Likert, 1932). Data was collected with the CALS Survey Builder and then transferred it into Microsoft Excel (Excel 2007, Version 12.3.6) for analysis. Once all responses were rated, the five to ten top rated responses to each question were identified using descriptive statistics (mean and standard deviation) and graphed.

**Figure 1.**



Map of college and university student farm programs initially contacted to participate in Delphi study (N=34).

ning 23 states (Figure 1, Table 1). The entire survey process (Rounds 1, 2 and 3) finished on July 23, 2012.

We used the NCSU College of Agriculture and Life Sciences (CALS) Survey Builder software to create the online surveys. The first survey (Round 1) was used to develop a comprehensive list of open-ended responses to ten questions that examined survey participants' perspectives of five key student farm characteristics including: 1) successful components for establishment and long-term management; 2) successful educational and outreach strategies for students and community; 3) student farm challenges, issues and potential solutions; 4) current funding resources and strategies; and 5) ideas for future educational and outreach strategies for student farms. A panel of experts in Crop Science, Horticulture Science, Soil Science and Agricultural and Extension Education departments at NCSU helped develop the content and validity of these questions. Because the responses from Rounds 1 and 2 were very lengthy, they are considered as part of the Delphi process and not presented as results here. Only the prioritized list from Round 3 is presented as results of this study (Tables 2-6). Round 2 consisted of coding and collating the previous round's responses and then resubmitting all answers back to each participant. The participants then reviewed all responses and had 7 weeks to revise any previously made statements or add new responses to the list. In Round 3, a final comprehensive list of responses was generated and participants were asked to rank the importance and/or relevance of each

## Results and Discussion

Initially, 53 individuals from 34 student farm programs were invited to participate, with a total of 24 possible individuals (45%) across 24 farm programs (71%) completing Round 1. Minimal attrition occurred from Round 1 to 2 and remained the same from Round 2 to 3. A total of 265 unique responses were generated from the ten survey questions in Rounds 1 and 2. Each question generated at least 17 responses (mean = 27, maximum = 40).

### Successful Components for Establishment and Long-Term Management

The first category of questions identified the most successful components contributing to student farm establishment and long-term management. Student farm leaders highly ranked the importance of having a full-time and experienced farm manager and it was top on the list for each of the three questions related to characteristics of successful student farms (Table 2). Similarly, Biernbaum (2011) stressed the importance of hiring a capable farm manager that additionally possesses passion and a commitment for experiential learning and group dynamics. Other highly ranked responses emphasized the importance of focusing on education, experiential learning and demonstration of sustainable agriculture practices (Table 2). Experiential learning opportunities are recognized as extremely important for SAE (Parr et al., 2007). While there are many ways to offer experiential learning opportunities, student farms, especially accessible to students, can provide year round student learning and investigation. Many student farms are started by and staffed by students, but drawing from the collective expertise of student farm leaders in this study, the long-term success hinges on supporting a full time farm manager well (including benefits, vacation time, etc.). Van Horn (2011) described the importance of creating a full-time farm manager position during the developmental years of the University of California (UC) Davis Student Experiential Farm (SEF). The UC Davis SEF farm manager is additionally supported by other part-time staff positions to meet the growing needs and program offerings (Parr and Van Horn, 2006). Other highly ranked successful student farm components in this study included competent and committed staff, land tenure, administrative support and a steady source of funding (Table 2). Participants also highly ranked student involvement and student sense of owner-

ship as successful student farm components. Trexler et al. (2006) similarly found practical experiences, student governance and shared responsibilities as highly ranked necessary experiences for SAE curricula from various agricultural practitioners nationwide. This may indicate allowing experienced students to make some managerial decisions or having apprentice-type roles on student farms. This can help provide lateral mentoring opportunities for more experienced students to train lesser-experienced students on farm.

**Successful Educational and Outreach Strategies**

The second category of questions identified successful educational and outreach strategies for both students and community members on student farms. Student farm leaders identified internships and opportunities to use farm equipment as two of the top ten ranked educational strategies for students (Table 3). Interdisciplinary learning from diverse guest/faculty lectures, summer courses for both graduate and undergraduate students and organic farm production training were also ranked highly as effective educational strategies for students. Interdisciplinary learning in SAE should be broad, integrating natural and social science knowledge, skills and understanding (Parr and Van Horn, 2006). Other highly ranked responses included student participation in community supported agriculture programs (CSA; where individuals purchase a weekly production share prior to the season), tours and events and research projects (Table 3), which can enhance students’ personal and professional development, in addition to increasing agricultural production skills.

A variety of successful educational and outreach strategies designed to engage community members

was also identified by survey participants. One of the most highly ranked successful strategies for community outreach was growing and selling produce from the student farm in a CSA program (Table 3). CSA programs are common within various student farms (Ngouajio et al., 2006), providing marketing education to students and generating revenue. They also can provide opportunities for students to develop communication and organization skills with consumers, as well as recognize the importance of a contractual agreement between the student farm and outside parties (Slotnick, 2011). Additional top ranked community outreach strategies included hosting tours for general community and K-12 audiences, farmer training programs, volunteer workdays and connecting with local non-profit organizations (Table 3). Some student farms also donate food to food banks and related community organizations. Slotnick (2011) of the University of Montana’s Program in Ecological Agriculture and Society Farm (PEAS), described one of their main initial community engagement strategies was developing the student farm as joint non-profit and university venture that grows food for the local food bank and educates students in the process. Through community engagement strategies like these and others, student farms can go beyond the scope of education focused just on students, but further rooting the student farm as an integral piece of the community.

**Challenges, Issues and Potential Solutions for Managing Student Farms**

In the third category of questions, survey participants were asked to identify the most significant challenges, issues and potential solutions on student farms. Challenges were described as something that may occur on a daily basis, distinct from issues that were

**Table 2. Student farm leaders’ mean (M) ranked responses and standard deviation (SD) from Round 3 from three questions that identify successful components for student farm establishment and long-term management. Total number (n) of different responses from participants in Rounds 1-2 is included for each question.**

Category: Successful Components for Student Farm Establishment and Long-Term Management		M	SD
Rank	Question 1. Characteristics of a successful student farm (n=40)*		
1	Experiential learning is key	4.80	0.41
2	Fulltime farm manager	4.75	0.55
3	Demonstrates sustainable agriculture practices	4.72	0.46
4	Competent staff	4.70	0.47
5	Educationally focused	4.70	0.47
	Question 2. Components necessary for the establishment of a new student farm (n=34)*		
1	Experienced farm manager	4.65	0.67
2	Fulltime farm manager	4.60	0.68
3	Land (acquisition and tenure)	4.55	0.51
4	Startup budget	4.50	0.61
5	Committed team members with team-based and leadership qualities, and desire to involve others	4.45	0.60
	Question 3. Factors contributing to sustain long-term management of a successful student farm (n=26)*		
1	Experienced and dedicated farm manager and staff	4.75	0.55
2	Administrative support (personnel and funding)	4.60	0.50
3	Effective communication	4.60	0.50
4	Enthusiastic and positive attitude	4.50	0.61
5	Faculty support	4.45	0.60
6	Farm manager has proper benefits, vacation time, is treated well, etc.	4.40	0.75
7	Students feel sense of ownership and importance at farm	4.40	0.60
8	Teamwork/team based	4.40	0.69
9	Agriculturally and technically proficient	4.35	0.59
10	Maintains student involvement and interest in summer months (when most students leave)	4.35	0.89

\*Rating Scale: Not Important (1), Minimally Important (2), Somewhat Important (3), Important (4), Very Important (5).

## Identifying Key Characteristics

**Table 3. Student farm leaders mean (M) ranked responses and standard deviation (SD) from Round 3 from two questions that identify successful educational and outreach activities for college/university students and community members on student farms. The total number (n) of different responses from participants in Rounds 1-2 is included for each question.**

Category: Successful Educational and Outreach Strategies for Students and Community Members		M	SD
Rank	Question 4. Successful educational and outreach strategies for college/university students on student farms (n=24)*		
1	Student internships	4.42	0.69
2	Students practice using farm equipment	4.26	0.81
3	Interdisciplinary undergraduate and graduate classes involved with farm during summer months	4.22	0.88
4	Guest lecturers (agriculture-related and interdisciplinary)	4.16	0.69
5	Organic farmer course taught on-farm	4.12	1.22
6	CSA	4.05	0.83
7	Community tours and events	4.00	0.92
8	Undergraduate and graduate research projects involved with farm	4.00	0.94
9	Social events on farm	3.9	1.07
10	Host farm tours and field trips	3.89	1.05
Question 5. Successful educational and outreach strategies for community members on student farms (n=17)*			
1	CSA	4.26	1.05
2	Host tours (K-12 and/or home-school)	4.16	0.90
3	Farmer's markets/plant sales	4.15	1.14
4	Host tours (general community)	3.79	1.08
5	General community education workshops hosted by farm staff	3.53	1.12
6	Host professional disciplinary and interdisciplinary speakers	3.47	1.13
7	Connection with local non-profit that runs youth children programs, curriculum design, and teacher training	3.41	1.18
8	Farmer training programs	3.40	1.40
9	Non-profit partnership	3.24	1.44
10	Farm available to campus and community for events (fundraising, annual harvest festivals, donations, etc.)	3.21	1.53

\* Rating Scale: Not Successful (1), Minimally Successful (2), Somewhat Successful (3), Successful (4), Very Successful (5)

**Table 4. Student farm leaders mean (M) ranked responses and standard deviation (SD) from Round 3 from three questions that identify most significant student farm challenges, issues, and potential solutions. The total number (n) of different responses from participants in Rounds 1-2 is included for each question.**

Category: Most Significant Student Farm Challenges, Issues, and Potential Solutions		M	SD
Rank	Question 6. Greatest Challenges for Establishing and Managing a Successful Student Farm (n=27)*		
1	Constant funding	3.55	1.10
2	School bureaucracy/red tape	3.20	1.20
3	Lack of administrative and institutional support	3.05	1.36
4	Staff burnout	3.05	1.15
5	Equipment management	3.00	0.86
6	High student turnover	3.00	1.12
7	Organizing/working around student schedules	2.95	1.05
8	Farm visibility (college/university wide)	2.90	1.12
9	Torn between production and educational foci	2.90	1.07
10	Maintaining enthusiasm and positive attitude during difficult times	2.85	1.27
Question 7. Greatest Issues for Establishing and Managing a Successful Student Farm (n=30)**			
1	Lack of time	3.40	1.31
2	Continuous funding	3.25	1.25
3	Difficulty to make a living in agriculture	3.25	1.16
4	Data collection and documenting results from educational outcomes is difficult	3.10	1.07
5	Sustaining full institutional support (trustees, administration, faculty, etc.)	2.95	1.54
6	Difficulty when working with various organizations (acquiring building permits, livestock permits, licensing, city irrigation regulations, etc.)	2.85	1.04
7	Balancing production focus with educational focus	2.80	1.11
8	Lack of explicit system for student shared governance	2.70	1.45
9	Expressing the real value of the farm to others (college/university and community)	2.65	1.09
10	Increasing privatization of public university results in less support for experiential educational programs	2.65	1.42
Question 8. Practical Alternatives and Solutions For When Managing a Successful Student Farm (n=22)***			
1	Experienced farm manager	4.70	0.57
2	Clear communication between farm staff and students	4.50	0.61
3	Enthusiastic and positive attitude	4.50	0.51
4	Establish positive relationships with administrative support from "home department"	4.50	0.61
5	Creating a sense of ownership for students	4.35	0.75
6	Having a clear farm vision and long-term plan	4.35	0.67
7	Communicating and marketing the multiple benefits of student farms to others	4.30	0.67
8	Start small and continue to be realistic	4.30	0.80
9	Securing constant funding	4.26	0.56
10	Having a strong management team, chain of command, shared governance structure and all roles for all parties (students, faculty, staff, and administration) are clearly defined	4.25	0.55

\* Rating Scale: Not Challenging (1), Minimally Challenging (2), Somewhat Challenging (3), Challenging (4), Very Challenging (5);

\*\*Rating Scale: Not an Issue (1), Minimally an Issue (2), Somewhat an Issue (3), Issue (4), Very much an Issue (5);

\*\*\*Rating Scale: Not Important (1), Minimally Important (2), Somewhat Important (3), Important (4), Very Important (5)

larger, on-going problems. It was not surprising that one of the top responses for the greatest day-to-day challenges was securing constant funding (Table 4). In a similar study that surveyed challenges on student farms throughout the United States, Leis et al. (2011) found working with a limited budget and gaining administrator support were significant challenges. Participants in his study also highly ranked lack of administrator and institutional support as a significant challenge. Other highly ranked challenges found in this study included institutional bureaucracy, staff burnout, equipment management and high student turnover. Another highly ranked challenge was being torn between the sometimes competing goals of increasing production and optimizing educational experiences on the student farm (Table 4). While a growing number of student farms rely on farm sales and CSA programs to support the operations (Leis et al., 2011), the responsibility to meet these contractual obligations may at times require sacrificing a teachable moment in order to meet the production demands (Slotnick, 2011).

Highly ranked issues identified by student farm leaders were similar to the challenges but there was slightly less agreement indicated by the higher standard deviation values compared to other questions. Top issues included lack of time, lack of continuous funding, difficulties of making a living in agriculture, documenting results from educational outcomes and difficulties of working with other organizations or city policies (Table 4). Other highly ranked issues included lack of a system for student shared governance and challenges in expressing the farm value to others.

While many of these constraints are not new, a unique aspect of this study was to ask student farm leaders to identify the most practical solutions to commonly observed challenges and issues on student farms. One of the highest ranked solutions identified was having an experienced farm manager (Table 4). Throughout our study, the importance of employing an experienced and dedicated farm manager was continually identified as critical to the success of a student farm in both the establishment and long-term sustainability. While students and faculty have been critical in providing the grass roots efforts, enthusiasm and initiative to get student farms started, students turnover quickly and faculty are often too busy to provide the needed focus. A farm manager, if well supported (e.g., adequate salary, benefits, time off, farm budget and resources), can provide the consistency, documentation and historical knowledge of the land as well as the campus political environment to support successful production and most importantly, SAE to various learners on the farm. Student farm leaders also identified a diversity of other highly rated solutions, ranging from clear communication between farm staff and students, sustained enthusiasm, establishment of positive relationships with administrative supporters from the home department, documentation of a clear vision and long-term plan, a sense of ownership with students and securing constant

funding (Table 4). While some of these solutions may resonate more than others with different student farms, it is clear that student farms are attracting new students to agriculture and providing critical spaces for experiential learning (Parr and Trexler, 2011; Sayre and Clark, 2011). Student farms are assets to the universities both for enhancing experiential education in sustainable agriculture and community engagement (Sayre and Clark, 2011) and should be supported as so.

### Current Funding Resources and Strategies

While funding is a recognized challenge, student farms have diverse strategies for support. One of the highly ranked funding strategies identified by student farm leaders was demonstrating the farm as a viable asset to the college/university (Table 5). Encouraging diverse university courses and student groups to utilize the student farm may be a way to do this. This could also take the form of documenting diverse educational outcomes, including those that are transformative and distinct from farming skills such as gaining confidence, critical thinking and civic engagement (Biernbaum, 2011). Other highly ranked funding strategies identified were institutional support, CSA programs and market revenue from on and off campus sales, grant funding and tuition/registration fees (Table 5). Student farms are critical foundations of university SAE programs and it is important to communicate effectively the various student and community benefits from student farms to institutional administrators, campus leaders and to the surrounding community as a preliminary fundraising strategy. Dining hall purchases and funding through established foundations were also identified as effective funding strategies, but at a lower rank. Dining hall purchases can also extend the education and outreach of the student farm on campus to a greater number of students that may not be able to visit the farm. These may be underexplored resources with increasing importance in the future. Bettman (2011) described the importance of foundational funding through a local donor and support from the university department to the survival of the University of Oregon's Urban Farm. Funding examples such as these emphasize importance of having diverse strategies for student farms from university support, grants, sales and fundraising in the community.

### Ideas for Future Educational and Outreach Activities

Student farm leaders generated a variety of ideas for future educational and outreach activities from undergraduate and graduate courses taught on the farm, increasing the diversity of on-farm education, dining hall programs, food bank donation programs, train the trainer workshops, service learning and others (Table 6). Some of these are already in place on student farms and provide examples to learn from, yet an effective communication network among student farms to discuss these and other successful strategies is lacking.

## Identifying Key Characteristics

**Table 5. Student farm leaders mean (M) ranked responses and standard deviation (SD) from Round 3 that identify current funding resources and strategies. The total number (n) of different responses from participants in Rounds 1-2 is included for each question.**

Category: Current Funding Resources and Strategies		M	SD
Rank	Question 9. Funding Strategies Used for Successful Student Farms (n=21)*		
1	Demonstrate farm is a viable asset for university (strategy)	4.30	0.73
2	Institutional support	4.25	1.12
3	Market revenue (on and off-campus)	4.20	1.20
4	CSA	4.00	1.25
5	Grant funding	3.84	1.38
6	Class/tuition/registration fees	3.55	1.54
7	Demonstrate farm is a viable asset for community (strategy)	3.44	1.25
8	Dining hall purchases	3.10	1.55
9	Foundation funding	3.00	1.5
10	On-campus sales (special programs)	2.94	0.94

\*Rating Scale: Not Important (1), Minimally Important (2), Somewhat Important (3), Important (4), Very Important (5)

**Table 6. Student farm leaders mean (M) ranked responses and standard deviation (SD) from Round 3 that identify future educational and outreach activities on student farms. The total number (n) of different responses from participants in Rounds 1-2 is included for each question.**

Category: Ideas for Future Educational and Outreach Activities on Student Farms		M	SD
Rank	Question 10. Possible Future Educational and Outreach Strategies on Student Farms (n=24)*		
1	Undergraduate and graduate courses taught on-farm	4.42	0.84
2	Diversity on-farm lessons (examples: wildlife biology, post-harvest physiology, animal production systems, value-added projects, mushroom cultivation, energy conservation, cooking courses, etc.)	4.35	0.75
3	Dining hall programs	4.26	0.99
4	Food bank donation programs	4.21	1.03
5	Train-the-Trainer workshops	4.11	0.99
6	Innovative on-farm energy projects and demonstration areas	4.00	0.97
7	Service-learning opportunities	3.95	0.71
8	Student-taught laboratories and field activities	3.95	0.85
9	Fundraising activities and social events	3.94	0.80
10	Graduate research efforts	3.94	1.26

\*Rating Scale: Not Possible (1), Minimally Possible (2), Somewhat Possible (3), Possible (4), Very Possible (5)

## Conclusions and Recommendations

Student farms have provided important venues for students (and community) to gain practical experiences in sustainable agriculture, in addition to skills in problem solving, decision making, effective communication and team work (Sayre and Clark, 2011). Student farms can also incubate new SAE programs rooted in experiential learning and critical thinking (Van Horn, 2011). Student farms also provide important and sometimes under recognized benefits as they continue to attract new students to agriculture and to the universities that they are located at (Leis et al., 2011). This study fills a critical knowledge gap by identifying the collective successes, challenges, solutions and diverse educational activities occurring on a diversity of student farms across the nation. One of the main findings from this study was the importance of supporting farm manager for the establishment and long-term success of student farms. A farm manager was also identified as an important solution to common challenges and issues.

This study also describes the diverse educational strategies employed on student farms. Although most activities are focused on students, there were a number of educational activities identified for the community. Opportunities to increase community engagement and student-community learning exchanges on student farms can foster greater partnerships between the campus and community and extend SAE to a greater number of people. Ideas for future educational and outreach activities on student farms included increasing the diversity and disciplines of courses taught on-farm,

research projects, dining hall purchases, food donations and service learning opportunities. These learning opportunities and innovations on student farms cannot be realized, however, without addressing some of the major funding, college/university support and other challenges identified in this study. From the growing student enthusiasm and engagement on student farms nationwide, there is no indication of this movement slowing down anytime soon. Future studies and increased communication and collaboration among student farms will collectively benefit all and push the boundary of what is possible on student farms.

## Literature Cited

- Bettman, A. 2011. University of Oregon. 1976: Designing for change. In: Sayre, L. and S. Clark (eds.). Fields of learning: The student farm movement in North America. Lexington, Kentucky: The University Press of Kentucky.
- Biernbaum, J. 2011. Michigan State University. 2003: Four-season student farming. In: Sayre, L. and S. Clark (eds.). Fields of learning: The student farm movement in North America. Lexington, Kentucky: The University Press of Kentucky.
- Bradley, L.K. and K. Baldwin. 2011. How to organize an allotment community garden. AG-727W. North Carolina Cooperative Extension: 17 p. <[http://cals.ncsu.edu/hort\\_sci/extension/documents/ag-727.pdf](http://cals.ncsu.edu/hort_sci/extension/documents/ag-727.pdf)>.
- Draper, C. and D. Freedman. 2010. Review and analysis of the benefits, purposes and motivations associ-

- ated with community gardening in the United States. *Jour. of Community Practice* 18(4): 458-492.
- Feenstra, G., S. Haresty, P. Allen and J. Perez. 2008. Building local food programs on college campus. UC Davis Department of Agricultural Resource Economics and UC Santa Cruz Center for Agroecology and Sustainable Food Systems Publication: 1-20.
- Leis, A., S. Whittington, M. Bennet and M. Kleinhenz. 2011. Student farms at United States colleges and universities: Insights gained from a survey of the farm managers. *NACTA Journal* 55(1): 9-15.
- Likert, R. 1932. A technique for the measurement of attitudes. *Archives of Psychology* 140: 1-55.
- Markhart, H.A. 2006. Organic educational opportunities at the University of Minnesota: The role of a student-run organic farm. *HortTechnology* 16(3): 443-445.
- McInturff, S. 2009. The Delphi Method. *Forecasting and Futurism Newsletter* 1: 10-15. <<http://www.soa.org/library/newsletters/forecasting-futurism/september/ffn-2009-iss1.pdf>> Nov.5, 2012.
- Ngouajio, M., K. Delate, E. Carey, A.N. Azarenko, J.J. Ferguson and W.J. Sciarappa. 2006. Curriculum development for organic horticulture: Introduction. *HortTechnology* 16(3): 414-417.
- Okoli, C. and S.D. Pawlowski. 2004. The Delphi method as a research tool: An example, design considerations and applications. *Information & Management* 42: 15-29.
- Parr, D., C. Trexler, N.R. Khanna and B.T. Battisti. 2007. Designing sustainable agriculture education: Academics' suggestions for an undergraduate curriculum at a land grant university. *Agriculture and Human Values* 24: 523-533.
- Parr, D. and C. Trexler. 2011. Students experiential learning and use of student farms in sustainable agriculture education. *Jour. of Natural Resources & Life Sciences Education* 40: 172-180.
- Parr, D. and M. Van Horn. 2006. Development of organic and sustainable agricultural education at the University of California, Davis: A closer look at practice and theory. *HortTechnology* 16(3): 426-431.
- Pawelek, J.C., G.W. Frankie, R.W. Thorp and M. Przybylski. 2009. Modification of a community garden to attract native bee pollinators in urban San Luis Obispo, California. *Cities and the Environment* 2(1): 2-15.
- Sayre, L. and S. Clark. 2011. *Fields of learning: The student farm movement in North America*. Lexington, KY: The University Press of Kentucky.
- Slotnick, J. 2011. University of Montana. 1997: Agriculturally supported community. In: Sayre, L. and S. Clark (eds.). *Fields of learning: The student farm movement in North America*. Lexington, Kentucky: The University Press of Kentucky.
- Teig, E., J. Amulya, L. Bardwell, M. Buchenau, J.A. Marshall and J.S. Litt. 2009. Collective efficacy in Denver, Colorado: Strengthening neighborhoods and health through community gardens. *Health & Place* 15: 1115-1122.
- Trexler, C., D. Parr and N. Khanna. 2006. A Delphi study of agricultural practitioners' opinions: Necessary experiences for inclusion in an undergraduate sustainable agricultural major. *Jour. of Agricultural Education* 47(4): 15-24.
- Van Horn, M. 2011. University of California, Davis (1977): Moving from the margins toward the center. In: Sayre, L. and S. Clark (eds.). *Fields of learning: The student farm movement in North America*. Lexington, Kentucky: The University Press of Kentucky.

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