

Student Farms at United States Colleges and Universities: Insights Gained from a Survey of the Farm Managers

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Abstract

Student farms at United States colleges and universities enhance curricula by integrating research, extension and teaching missions, reinforcing classroom instruction, and improving job training. Student farms are sites of agricultural production and marketing at which students have, through coursework and/or internships, opportunities to supplement classroom instruction with "real world" experience. Student farms and their influence on curricula began decades ago, but the number of farms and their impact have increased recently. Although increasingly numerous, the structure, programming, and operating principles of student farms have not been studied. A lack of knowledge regarding student farms hinders the development of new farms and ongoing success of existing farms. Therefore, an online survey of student farm managers was distributed in order to gain insights into the current status of student farms in the United States.

The data were used to determine that college and university student farms are diverse in operating characteristics. Though many groups contribute to successful farm operation, undergraduate students are the largest group to participate in and benefit from student farms. Working with a limited budget was the most significant challenge faced, though despite various challenges, farm managers on average, reported that their farms were operating successfully. Managers also indicated that their farm played a role in attracting students to attend their college or university.

Introduction

"The land grant institution was created under the Morrill Act with the purpose of, among other things, ...teaching such branches of learning as are related to agriculture..."(Collier, 2002, p. 182). College and university student farms have been present on campuses throughout the United States for the duration of the passing of the Morrill Act. Student farms vary greatly in size and focus, but a common philosophy is their role in providing students with opportunities to gain valuable skills through applied experiences. In addition to acquiring various skills, involvement with a student farm allows students a concrete medium in which to solidify knowledge gained through coursework.

Student farms currently operating across the United States offer a wide range of learning opportunities through which students can gain experience to supplement coursework, major programs and certificate programs, and provide opportunities for internships and volunteering.

The educational basis for inclusion of student farm opportunities in curricula is grounded on the idea that these opportunities serve as a form of experiential education. Stated simply, experiential education is learning by doing (Andreasen, 2004), and the basis of this type of education rests upon a foundation of four pillars, including learning in real-life contexts, learning by doing, learning through projects, and learning by solving problems. The essence of experiential education is that of engaging students to "solve problems inductively, actively use and explain knowledge through solving problems, and make connections and apply knowledge beyond the classroom and school, based on real-life problems" (Knobloch, 2003, p. 23).

John Dewey's name is associated with the term experiential education (Knobloch, 2003), and was an early proponent of this educational model. According to Dewey, "Education, in order to accomplish its ends both for the individual learner and for society must be based upon experience" (Dewey, 1938, p. 89). Many others serve as strong proponents of the experiential education model (Mak, 1992; McKeachie, 1999; Saddington, 1992). Thus, calls to incorporate experience-based learning into the curriculum in higher education have been widespread (Boyer Commission, 1998; National Leadership Council for Liberal Education & America's Promise, 2007; U.S. Department of Labor, 1991).

Recommendations to shift agricultural curricula to an experiential learning model, grounded in real-life situations and problems (Francis et al., 2001; Knobloch, 2003) and specifically to incorporate farm-based experiences (Parr et al., 2007; Steiner and Vogel, 2005; Trexler et al., 2006), have been made by many. From very early years, student farms provided an excellent medium in which to present problem material to students (Murray, 1945). Consequently, various studies lend support to the inclusion of student farms in college curricula. For example, a survey of College of Agriculture Academic Associate Deans identified the importance of providing hands-

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on learning experiences as equally important with traditional teaching methods. In addition, findings from the study revealed that experiential learning and lecture tied as the most important practices used for teaching (Fields et al., 2003).

Benefits offered to students involved with student farms included the chance to develop a vast array of abilities, including critical thinking, decision making (Steiner and Vogel, 2005), problem solving (Trede et al., 1992), application of knowledge (Murray, 1945; Steiner and Vogel, 2005), sense of responsibility, leadership skills (Hillers, 1983), management skills (Murray, 1945), motivation, work ethic (Knobloch, 2003), and building of interpersonal relationships (Hillers, 1983; Trede et al., 1992). These abilities are crucial in the job market, as employers seek potential employees skilled in problem solving, critical and analytic thinking (Gordon, 1976), adaptability, effective communication, and ability to work as a member of a team (Washer, 2007), in addition to a practical background in agriculture (Mayer, 1980).

A changing student population provides additional support for the development of student farms, where students lacking practical knowledge can gain hands-on experience. Students enrolled in agriculture courses come increasingly from urban and non-farm backgrounds and therefore, lack practical knowledge in agriculture (Dyer et al., 1999; Mayer, 1980; Scofield, 1995). Because these students lack practical knowledge, emphasis must be placed on including experience-based opportunities in curricula in order to properly prepare students for careers in agriculture.

In addition to the benefits students receive, student farms offer varied benefits to the colleges and universities at which they are located. One major benefit is the potential of attracting students to attend the college or university, or attracting students to pursue agricultural courses and majors. The student farm at North Carolina State University serves as an example of the potential that student farms offer in attracting students. The NCSU farm attracts involvement from a wide range of participants including students from a variety of disciplines, 63% from outside of North Carolina, 11% internationally, and 56% of who have had no agriculture or related training (Schroeder et al., 2006). At a time when attracting students into traditional agriculture programs is becoming increasingly difficult (Campbell et al., 2003), attraction to school farms is of tremendous importance.

Problem, Purpose, and Objectives

Though student farms have served a role in higher education for over a century, in recent years, development of these farms has increased significantly. Since 1990, at least 41 student farms have been established in the United States (The New Farm website, [www.newfarm.org/depts/student-](http://www.newfarm.org/depts/student-farm/directory.shtml)

[farm/directory.shtml](http://www.newfarm.org/depts/student-farm/directory.shtml)) that met the following definition of student farms that was used in this study:

Puts students to work in ways that teach them about crop production as well as direct marketing. All work—from planning to harvesting—is done by students. The farm demonstrates basic plant and animal husbandry, professional cultivation methods, integrated pest management and research. (Holzhueter, 2006, p.1)

With such strong interest in the development of these farms, research designed to gain a better understanding of the status of currently operating farms is imperative. In addition to providing valuable information to schools aiming to establish a student farm, this research will benefit farms currently in operation that are looking to learn from the experiences of others. Therefore, the purpose of this study was to describe the current status of student farms at colleges and universities in the United States, from the perspective of the farm managers.

Objectives guiding the study included describing farm managers' perceptions of:

1. demographics of student farms
2. participants and their roles at student farms
3. programming and operations of student farms

Methods

Subject Selection

This study was conducted as a census of student farm managers at colleges and universities in the United States. Potential subjects were included on The New Farm website's Farming for Credit Directory, which lists college and university hands-on agricultural education opportunities. The list, including 79 college and university student farms, was obtained from <http://www.newfarm.org/depts/student-farm/directory.shtml> on February 19, 2008. Through searching university, college, and student farm websites, and through making personal phone calls, a manager for each farm was identified. In the case that a farm lacked a designated manager, the person referred to as manager was the faculty, staff, or student leader overseeing farm operations. Through making these contacts, in nine cases it was verified that student farms were not in operation, and therefore these schools were removed from the list.

To broaden the frame to include farms not listed on The New Farm website, various collection techniques yielded 70 farm managers who were sent an email requesting a list of five student farms at colleges or universities in the United States. Responses were added to the original list and duplicates deleted. Multiple farms operating on separate campuses within a college or university were included individually on the list. Ten previously unidentified student farms were discovered through this method, whose managers were then verified. These techniques yielded 80 college and university student farms whose managers served as the frame for this study.

Instrument Design

The researcher-designed questionnaire included four sections containing 36 quantitative and qualitative items designed to gain a better understanding of the current status of college and university student farms in the United States. The four sections focused on student involvement, programming, operating characteristics, and farm demographics. Content and face validity were established by a review from a panel of experts in Horticulture and Crop Science and Social Science.

Survey Implementation

Data were collected using Dillman's (2000) tailored design method. One week prior to survey launch, a handwritten postcard was hard-mailed informing subjects that notice of an electronic survey would be arriving in their email accounts the following week. On April 17, 2008, an email was dispersed to the target population detailing instructions for survey completion. Zoomerang™ online survey was used to administer the survey. The survey remained accessible through April 29, during which time non-respondents received two thank you/reminder emails encouraging them to complete the questionnaire.

Statistical Analysis

Data were analyzed using SPSS version XVI. Appropriate descriptive statistics including percentages, means, medians, modes, and standard deviations were used to describe the accessible population of student farms at colleges and universities in the United States.

Results and Discussion

Of the 80 potential subjects receiving a survey invitation, 50 responses were received for a response rate of 62.5%. The majority of farms participating in the study were located at land grant universities (37%) or liberal arts colleges (37%), while some were located

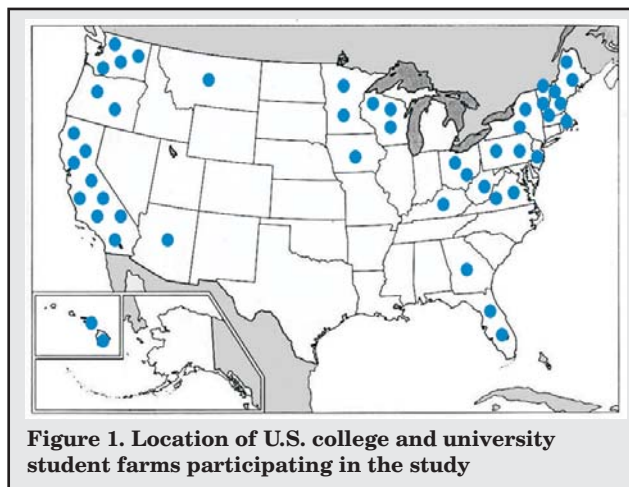


Figure 1. Location of U.S. college and university student farms participating in the study

at non-land grant universities (15.2%), community colleges (8.7%), and technical colleges (2.2%). Geographically, farms were located primarily in the eastern United States and on the west coast (see Figure 1). The majority of colleges and universities at which these farms were located offered courses (85.1%) and major programs (59.6%) in agriculture. Apparently, benefits of student farms are still offered at institutions not offering any courses in agriculture, since a few farms are currently in operation at these locations.

Average farm size exhibited bimodal distribution, with the majority of farms being 0-4 acres (43.5%) or over 50 acres (30.4%). Principles on which farms operated included organic (77.8%), sustainable (62.2%), and traditional (28.9%). These results reflect that certain farms are operating using more than one of the principles listed. While a large percentage of farms were established prior to 1979 (38.3%), the majority have been established since 1990 (59.5%), with 10.6% established from 1990-1994, 17% established from 1995-1999, 17% established from 2000-2004, and 14.9% in 2005 or later (see Table 1). If this

Table 1. Year of Establishment of College and University Student Farms in the United States

Year farm was established	f*	%
Prior to 1979	18	38.3
1980-1984	1	2.1
1985-1989	0	0
1990-1994	5	10.6
1995-1999	8	17
2000-2004	8	17
2005 or later	7	14.9

*(n=47)

Table 2. Level of Involvement and Importance of Involvement of Various Groups Involved in U.S. College and University Student Farm Operations

	Labor provided by %*	Level of involvement**	Importance of involvement***
Undergraduate students	64	Very involved	Extremely important
Graduate students		Slightly involved	Slightly important
Faculty	19	Moderately involved	Very important
Staff	12	Moderately involved	Very important
Volunteers	8	Slightly involved	Moderately important
Administrators	1	Slightly involved	Moderately important
Alumni	1	Not involved	Slightly important
Industry persons	1	Not involved	Slightly important

*Totals over 100% due to respondent error.

**Scale: 1 = not involved, 2 = slightly involved, 3 = moderately involved, 4 = very involved, 5 = extremely involved

***Scale: 1 = not important, 2 = slightly important, 3 = moderately important, 4 = very important, 5 = extremely important

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trend continues, many more student farms will continue to be formed across the U.S. in coming years.

As can be seen in Table 2, student farms reported a mean involvement of 60-69 students (sd, 5.71) annually, who represented 7-8 different majors. Of the students involved in the farms, a mean of 88% (sd, 1.85) were undergraduates while 48% (sd, 3.29) were agriculture majors. Students were driven to be involved with farms due to course requirements (mean, 37%; sd, 3.39), membership in a student organization (mean, 37%; sd, 3.58), volunteering

(mean, 35%; sd, 3.14), work study (mean, 23%; sd, 2.93), internships (mean, 18%; sd, 1.95), and research projects (mean, 14%; sd, 1.58). In return for their involvement, 36% (sd, 3.26) received course credit, 35% (sd, 3.12) received pay, and 16% (sd, 2.22) received work study credit.

Students performed a range of farm responsibilities providing, on average, 64% (sd, 2.47) of farm labor, 52% (sd, 3.34) of student training, 50% (sd, 3.41) of implementing new projects and initiatives, 43% (sd, 3.55) of management decision making, 42% (sd, 3.73) of financial recordkeeping, 42% (sd, 3.91) of marketing products, and 40% (sd, 3.63) of worker supervision.

Though these are 'student' farms, the importance of involvement from other parties was clear in the survey results. A mean of four faculty (sd, 3.29), and three staff (sd, 3.22) were involved in each student farm annually (see Table 2). While students provided the majority of labor, faculty, staff and volunteers also provided substantial work effort, providing 19%, 12%, and 8% of the work effort respectively. Farm managers evaluated undergraduate students as being very involved, faculty and staff as moderately involved and graduate students, volunteers, and administrators as slightly involved. Regarding the importance of group involvement, managers perceived undergraduate student involvement to be extremely important, faculty and staff involvement as very important, volunteer and administrator involvement as moderately important, while the involvement of graduate students, alumni, and industry persons was perceived to be slightly important.

According to farm managers, undergraduate students received great value from the student farm, while departments, colleges, and communities received significant value. According to farm managers, faculty and universities received moderate value, while graduate students and the industry received slight value. It is important to note that students are not the only group receiving benefit from the efforts of operating a student farm.

Student farms were associated with various programs and organizations on the campuses on which they were located (see Table 3). The highest percentage of farms were associated with a program in organic or sustainable agriculture (80%). A large majority of farms were also associated with horticulture and crop science programs (76.2%), and student

Level of association	Agriculture		Horticulture, Crop Science, Plant Science, or Related Area		Animal Science		Organic or Sustainable Agriculture or Related Area		Environmental Studies		Work study program		Student organization		Campus initiative associated with sustainability	
	%	f***	%	f****	%	f***	%	f*	%	f**	%	f***	%	f****	%	f***
Not associated	12.2	5	11.9	5	36.8	14	8.9	4	27.9	12	33.3	9	22.5	10	25	10
Slightly associated	17.1	7	31	13	15.8	6	13.3	6	30.2	13	30.8	10	25	12	30	12
Moderately associated	14.6	6	14.3	6	7.9	3	15.6	7	20.9	9	15.4	7	17.5	13	32.5	13
Strongly associated	41.5	17	31	13	18.4	7	51.1	23	16.3	7	12.8	13	32.5	2	5	2
Not applicable	14.6	6	11.9	5	21.1	8	11.1	5	4.7	2	7.7	3	2.5	3	7.5	3

*(n=45)
 **(n=43)
 ***(n=42)
 ****(n=41)
 *****(n=40)
 *****(n=39)
 *****(n=38)

Table 3. Level of Association of Various Programs with College and University Student Farms in the United States

Table 4. Production Focus of College and University Student Farms in the United States

Production focus	% of farms producing	Average % of operation
Horses	17	5
Dairy cattle	10.6	5
Beef cattle	17.0	4
Swine	12.8	2
Sheep	17.0	3
Goats	4.3	0
Poultry	14.9	1
Grains	12.8	1
Forages	21.3	5
Vegetable crops	89.4	58
Fruit crops	61.7	10
Forestry crops	12.8	1
Nursery or greenhouse plants	31.9	4
Other	23.4	3

organizations (75%). These associations with programs and organizations likely help to ensure the presence of enough labor to keep the farms in operation.

Regarding programming offered by student farms, the majority of farms responding to the survey offered volunteering (85.7%), courses (77.6%), community activities (77.6%), internships (71.4%), field days (67.3%), and research projects (65.3%) as examples of programming efforts lesser percentages of farms offered programs in academic majors (38.8%), certificate programs (22.4%), and adult education (20.4%) in association with the farm. On average, five courses were taught in association with each farm, and students enrolled in these courses visited the farm 6-7 times during undergraduate enrollment.

Though production focus varied greatly among farms (see Table 4), vegetable production was clearly most common, with 89.4% of farms producing vegetables which made up an average of 58% of each farm operation. Fruit crops were produced by 61.7% of farms (average 10% of operation), while farms also produced nursery or greenhouse plants (31.9%), forages (21.3%), sheep (17%), beef cattle (17%), and

Table 5. Funding Sources for Initial Development and Current Operation of College and University Student Farms in the United States

	Initial development		Current operations	
	Mean %	Std. dev.	Mean %	Std. dev.
Farm product sales	-----	-----	29	3.31
College	30	3.68	23	3.56
University	17	3.05	14	3.08
Grant	17	2.73	6	1.23
Department	9	1.91	11	1.97
Program	9	2.54	9	2.38
Students	6	1.43	5	1.72
Industry donations	5	1.78	4	1.57
Community Donations	5	1.32	2	
Alumni donations	4	.93	3	1.20
Faculty	4	.93	2	.50
Sustainability initiative	3	.98	2	.56
Campus dining services	2	.63	3	.95

horses (17%). Production of multiple animal species and/or types of crops allows students greater learning opportunities than if producing a single crop or species of livestock.

Average annual operating budget for farms varied greatly from under \$5,000 to over \$125,000, (mean, \$50,001-\$55,000; sd, 9.98). Funding for both initial development and current operation of farms came from a variety of sources (see Table 5). College funds most commonly supported development of farms, providing an average of 30% of start-up costs, while universities (17%) and grants (17%) provided funding for development. Current operating costs derived most commonly from farm product sales (29%), colleges (23%), universities (14%) and departments (11%).

Various challenges were faced in operating student farms (see Table 6). Working with a limited budget was rated as most difficult, while gaining administrator support was considered challenging. Gaining faculty involvement and student interest were moderate challenges.

Student farm managers evaluated current operation of their student farm as extremely successful (8.5%), very successful (40.4%), moderately successful (44.7%), and slightly successful (6.4%). In addition, managers agreed their student farm played a role in attracting students to attend their college or university (see Table 7). Managers neither agreed nor disagree the farm served a role in attracting students from outside their state, while disagreement was expressed regarding the role the farm played in attracting students from outside the United States.

Table 6. Level of Challenge Posed by Various Factors in Operating College and University Student Farms in the United States

Student farm challenges	Working with a limited budget		Gaining student interest		Gaining faculty involvement		Gaining administrator support		Gaining community support	
	f*	%	f*	%	f**	%	f**	%	f***	%
No challenge	2	4.3	9	19.1	3	6.5	2	4.3	10	22.7
Slight challenge	5	10.6	17	36.2	8	17.4	7	15.2	19	43.2
Moderate challenge	14	29.8	10	21.3	15	32.6	15	32.6	13	29.5
Significant challenge	9	19.1	6	12.8	14	30.4	10	21.7	2	4.5
Great challenge	17	36.2	5	10.6	6	13	12	26.1	0	0
Mean	3.72		2.60		3.26		3.50		2.16	
Std. dev.	1.19		1.25		1.10		1.17		.83	

Scale ranged from 1 = no challenge to 5 = great challenge

*(n=47)
 **(n=46)
 ***(n=44)

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Table 7. United States College and University Student Farm Managers' Perceptions of the Role Played by Student Farms in Attracting Students from Various Locations to Attend a College or University

Role played by student farm in attracting students	To attend my college or university		From outside of the state		From outside of the United States	
	f*	%	f**	%	f***	%
Strongly disagree	4	8.3	8	17	18	39.1
Moderately disagree	4	8.3	3	6.4	10	21.7
Slightly disagree	0	0	5	10.6	4	8.7
Slightly agree	14	29.2	13	27.7	6	13
Moderately agree	13	27.1	10	21.3	1	2.2
Strongly agree	12	25	5	10.6	3	6.5
Not applicable	1	2.1	3	6.4	4	8.7
Mean*	4.27		3.43		2.11	
Standard deviation	1.63		1.81		1.62	

Conclusions

Student farms are currently serving important roles in a range of educational settings, especially at institutions lacking major programs and courses in agriculture. Because a diverse audience of students can benefit from involvement, student farm opportunities should be available to all students, especially those studying agriculture. A variety of programming options offers the potential to attract involvement from the greatest number of students, as well as greatest benefit to those involved. Hands-on experience, the opportunity most commonly offered to students in farm courses and internships, is a component lacking in most college courses (Ewing and Whittington, 2009), and therefore these real-life opportunities for skill-development and application of knowledge through involvement with student farms are extremely valuable and serve as an important supplement to classroom-based instruction.

Involvement of various groups is clearly needed for successful operation of student farms. Students are providing the majority of the work effort, yet for learning opportunities to be most effective, assistance from knowledgeable faculty and staff members is necessary, and therefore finding faculty and staff willing to assist with such an operation is crucial.

While student farms were commonly associated with sustainable and organic agriculture programs and courses, valuable learning opportunities exist, and should be offered, in a variety of disciplines. The greatest proportion of farms operated using organic principles, yet operating on varied principles potentially offers the greatest educational experience by allowing students to compare and contrast differing production practices.

Benefits of student farms extend beyond simply helping students (Holzhueter, 2006). Universities, colleges, departments, faculty, and communities also received substantial benefit, and these factors need to be considered in making decisions regarding support and resources devoted to student farms. It also needs to be promoted heavily when searching for potential funding sources. One potential benefit of great importance is the student farm's ability to attract students to attend a college or university. This

characteristic needs to be capitalized upon by promoting the work of the farm and opportunities for involvement in various settings, including the recruitment of students.

As discussed above, recommendations to shift agricultural curricula to an experiential learning model, grounded in real-life situations and problems (Francis et al., 2001; Knobloch, 2003) and specifically to incorporate farm-based experiences (Parr et al., 2007; Steiner and Vogel, 2005; Trexler et al., 2006), have

been made by many. If this is the case, and if the resources are available for student farms to exist, which they clearly are, why isn't a student farm in operation at every institution offering courses in agriculture? More research is needed to answer this question, as well as others. Understanding the farm operations in more detail, and the specific benefits and learning experiences offered to students is important. Studying the details of funding sources and the factors contributing to success of each individual farm would also allow other farms to improve their operations, and possibly more farms to be established.

Regardless of their size, budget, or the number of students involved, in general student farms are operating successfully across the United States. By continuing research and creating networking opportunities for those involved with student farms, farm success will be promoted and development of new farms facilitated. Through this, experiential learning will be increased and student learning will be maximized as students gain first-hand experiences in which they are able to gain valuable knowledge and skills.

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