

Undergraduate Education

A. Undergraduate education mission

In addition to the mission of the department, the undergraduate education faculty have the specific mission to provide to students the foundation, motivation, and continued support for a lifetime of learning and to stimulate their interest in serving society. To this end we have identified nine developmental focus areas for our students:

1. Technical expertise and its application*
2. Communication and interpersonal skills
3. Appreciation of social sciences, humanities, and the arts
4. Leadership and teamwork skills
5. Ethical practices
6. Business and management skills
7. International and cultural understanding*
8. Personal and social responsibility*
9. Motivation and abilities for continued learning

(* Listed as Essential Learning Outcomes by the American Association of Colleges and Universities --- College Learning for the New Global Century – Liberal Education and America’s Promise; www.aacu.org/leap)

B. Where we are now

1. Overview of program

The undergraduate program in Agronomy has 168 students enrolled in eight B.S. degree options and one associate degree option (number of students in each option is in parentheses): Agronomic Business and Marketing (33), Soil and Crop Science (14), Soil and Crop Management (21), Environmental Soil Science (2), Turf Science (58), Plant Genetics and Plant Breeding (19), Applied Meteorology (18), International Agronomy (2), and Agronomy Associate Degree (1) (Table 3.1, Figure 3.1). Our greatest growth has been in the Plant Breeding and Plant Genetics option and the Applied Meteorology option. Since the last review the total number of students enrolled in Agronomy has declined by 5 percent but our enrollments today are approximately 16 percent more than our low of three years ago (Figure 3.2). Seventy-nine percent of our students are male and 82 percent are from Indiana. Eight percent of our students are minority or international (Table 3.2). A comparison with other universities of Purdue’s undergraduate Agronomy enrollments and faculty teaching FTEs is presented in Table 3.3. SAT scores for incoming students have remained constant, up only 0.5 percent since the last review but up significantly over the past two years. The Agronomy student average SAT score of 1105 compares to 1079 for the College of Agriculture and 1145 for Purdue University (Table 3.4).

A survey of Purdue Agronomy alumni (Appendix I.1) indicated that 98 percent of the graduates were happy with their undergraduate experience. Academic advising and curriculum both received high marks. Currently 95 percent of our graduates are employed at graduation, and they are employed in a broad spectrum of positions with the highest percentage in chemical/seed industry, farm management, and agronomy positions. Turf management positions make up the next highest percentage of employment (Figure 3.3). The median starting salary of our B.S. graduates is \$42,000 with a range of \$30,000 to \$65,000. One hundred percent of our students participate in at least one internship program and the average number of internships and professional experiences per student exceeds four. Many graduates have been involved in undergraduate research. In 2001-2002, 11 students took special problems courses with individual faculty. In 2007-2008, this number has increased to 25 with the total since the last review equaling 158. Since 2001 fewer than 8 percent of our students have been dismissed for academic reasons.

In 2001-2002 we had 40 graduates and in 2007-2008 we had 44 (Table 3.5). The average number of graduates for each of the past seven years has been 46. Only about one or two students in agronomy each year earns an associate degree from agronomy; however, there are eight or nine students in other bachelor degree options in the College of Agriculture who elect to earn an associate degree from agronomy prior to receiving their bachelor's degree. Approximately five students each year obtain a minor in either Crop Science or Soil Science.

The faculty in Agronomy with teaching responsibilities (total teaching FTEs of 10.78, Table 3.6) offer 64 courses at the 100 to 500 levels of which 47 percent are laboratory or field experience courses. Since the last review, Purdue Agronomy has hired 14 faculty. These new positions have resulted in significant revisions and new course offerings in the areas of hydrology, turf science, crop production, soil fertility, remote sensing, pedology, genetics and plant breeding, plant physiology, climatology, and international agriculture. The largest annual enrollment courses in the department are (with enrollment in parentheses) Genetics (314), Genetics Lab (162), Soil Science and Forest Soils (286), Crop Production Systems (124), World Crop Adaptation (89), and Crop Production (77), (Table 3.7). Significant resources are devoted to the support and development of graduate teaching assistants. The department has 4.5 FTEs in TA appointments. The quality of the TA's in Agronomy has been recognized by the awards that many of them have received at the college and university levels.

The department supports four undergraduate clubs: Agronomy Club, Soil and Water Conservation Club, Turf Science Club, and the Environmental Science Club. Membership for these four clubs totals 85. These clubs provide community for the students, leadership experiences, and networking

opportunities with industry speakers, alumni, and students from other Agronomy departments around the country. The students participate in professional meetings and present oral and poster research papers and compete in quiz bowls and speech contests. This past year a member of the Purdue Agronomy Club was president of the student chapter of the Tri-Societies (SASES). This next year the national corresponding secretary is from Purdue, and we have two national program chairpersons. In addition, six competitive academic teams are advised in the department: Crops Teams (2), Soils Teams (2), and Turf Teams (2). Our new Agronomy Ambassadors program has grown over the last four years to become a significant leadership activity for students in our department.

Faculty advise our undergraduate students and this continues to be a very positive experience for our students. The number of faculty advisors is 17, up from 10 faculty at the last review. The Pre-Environmental Studies advising program at the university-level (5 students) and the college's interdisciplinary Natural Resource and Environmental Science program (61 students) are also headed by a faculty member in our department.

The department maintains a strong outreach program for K-12 teachers and students through Web-based resources, workshops on- and off-campus, and attendance at national and state education conferences. This past year more than 7,000 students and teachers participated in activities led by staff in our department.

In the following sections of this report, we will address the changes since our last review, the processes by which we address our goal of developing tomorrow's leaders, and our plans for the future.

2. Actions taken in response to the 2002 CSREES review

During the last review the Agronomy Department was complimented on its strong undergraduate program, its wide offering of options, its positive interactions among the faculty and staff and their interactions with the undergraduate students, its integration of the students into the department, its K-12 outreach programs, its mentoring of graduate teaching assistants, its strong participation in interdisciplinary programs, and its international components in the curriculum. As will be shown below, we have worked to maintain or strengthen all of these areas.

Since the last review we have hired two faculty (Turf Science and Crop Science) who have primary teaching appointments. These faculty complement the three other faculty who hold primary teaching appointments and ensure that a core of faculty exist who have undergraduate education at the center of their missions. This core of teaching faculty serves as a resource and support to the other faculty by making initial recommendations for

curricula improvement, securing education grants, addressing weekly issues that develop related to advising and student career opportunities, and representing the department at the education divisions of several professional organizations. The fourteen new faculty hired since the last department review provide additional or revised courses (12) to the undergraduate curriculum. This has greatly strengthened our course offerings in turf science, hydrology, soil fertility, crop science, land resources, meteorology and climatology, pedology, remote sensing, international programs, plant physiology, and genetics. Since the last CSREES Review our faculty have offered six international travel courses for undergraduate students and two more are being planned for this summer.

Our outreach to K-12 has expanded with a new Web site for students and teachers (http://www.agry.purdue.edu/k12_index.asp) and direct programming for teachers and students has increased. Programs and workshops for more than 7,000 teachers and students are conducted annually (Appendix I.2). Many teachers use these student workshops and Web resources such as worksheets, coloring pages, books, and laboratory experiments to meet Indiana Academic Standards in their classes. The Web site outlines how these activities meet specific state standards. The children's books associated with this outreach program (Peter Ped, Splish Splash, Bob the Bacterium, and Freddie Forage) have been distributed in the tens of thousands. Many of the science experiments and publications available to teachers began as demonstrations in our undergraduate courses and were used as part of our recruitment efforts in elementary, junior high and high schools by agronomy faculty and staff.

Since the last review we have expanded our mentoring program for graduate teaching assistants (TAs) to include the university's new Graduate Teacher Certificate and the Advanced Graduate Teacher Certificate Programs (Appendix I.3). These programs provide structured developmental activities for TAs that complement the department's programs and ensure quality instruction for our undergraduate students. We have had 17 students receive the Graduate Teacher Certificate and five receive the Advanced Graduate Teacher Certificate since the program began in 2002. This is the second largest number awarded to any department in the university. Three of our graduate students have received the Graduate School's Outstanding Teaching Award out of a total of 20 given since 2004. Three graduate students have been elected to the University Teaching Academy - this represents more than any other department in the university. These high number of recognitions are particularly significant when you consider the small number of graduate TAs employed in our department compared to many of the other departments in the university.

In 2008, a new undergraduate lounge with study tables and computers was established directly across the hall from the staff lounge. It is used by many

of the undergraduates for study and work on class projects. It also provides a great place for faculty to quickly stop by and interact with the students on an informal basis. Both the Crops and Soils Resource Centers provide similar opportunities for faculty and student interaction.

Recommendations from the last CSREES Review indicated that the department should:

- (1) Conduct a comprehensive review of the curriculum for each option including input from alumni, current students, and employers
- (2) Encourage all faculty to contribute to some level in the creation of innovative undergraduate programs
- (3) Increase use of instructional technologies to include those that can enhance distance education opportunities
- (4) Expand leadership, research, and internship opportunities for students

Below is a discussion of the steps that have been taken to address these recommendations:

Recommendations 1 and 2: Curriculum development and increased faculty involvement

In addition to the long-standing Teacher and Advisor Committee that meets weekly to discuss curriculum and regular business that affect undergraduate students, a Curriculum Committee made up of a broader faculty base was established. The Curriculum Committee is responsible for final review of all undergraduate and graduate curricular issues brought forward from individual faculty or groups of faculty through the Teacher and Advisor Committee. In addition, they are responsible for initiating regular review of each of the undergraduate options. Once a recommendation for change is developed by the Curriculum Committee it is brought to the entire faculty for a vote. Upon approval by the faculty, changes are taken to the Curriculum and Student Relations Committee of the college and then voted on by the entire college faculty. This has resulted in full faculty oversight of the curriculum and has incorporated academic perspectives not previously represented. Since the last review all undergraduate options have been reviewed to include courses that broaden the curricula without sacrificing the content of the technical material that has always been a strength of our options. Appendix I.4A-I outlines the course requirements for each of the department options.

One course in multicultural awareness has been added to all options, which now require nine credit hours of International Understanding and three credits of Multicultural Awareness. Major changes have been made in the Plant Genetics and Plant Breeding option and in the Turf Science option. Plant Breeding and Genetics curriculum has an expanded list of directed electives which helps the students focus on new areas of biotechnology and genomics.

At least one additional course in business and management has been included. Based on input from an external focus group consisting of industry leaders and employers, the Turf Science option was modified. The revised option places increased emphasis on business courses and encourages the students to earn a minor in Agri-business, Organizational Leadership and Supervision, and/or a Certificate in Entrepreneurship as well as providing greater flexibility in technical courses. The Agronomic Business and Marketing option has been restructured so that a minor in the Agricultural Economics Department can be obtained.

Capstone experiences for all of our students have been adopted since the last CSREES review. All students must take the capstone Senior Seminar course plus either an EPICS course, AGRY 512 (Integrated Turfgrass Systems), AGRY 585 (Land Use) or any capstone course offered by another department in the college, or conduct a research project and present the data as part of the university-wide Undergraduate Poster Symposium or at a national meeting or to a faculty review committee. A listing of all capstone courses is given in Appendix I.5.

As part of the curriculum review process, alumni were surveyed by the department in 2003 (Appendix I.1). This survey about perceptions of the Agronomy academic programs was conducted by contacting graduates from 1960 through 2003. The survey was part of a systematic review of the undergraduate curricula, courses, and academic advising to assess outcomes, identify gaps in the curriculum, measure how well the program addresses current and future needs, and provide a direction for change. There were 275 respondents to the survey, which was sent to 1,446 alumni.

Based on survey responses, alumni have a high regard for the Agronomy curriculum and academic advising programs at Purdue. However, in response to our request, alumni prioritized recommendations they believed would improve the quality and value of the educational program. They suggested that more emphasis be placed on problem solving and that equal emphasis be placed on the practical and theoretical aspects of the undergraduate curriculum. Their rankings indicated that areas such as biotechnology need to be more completely incorporated into the curriculum and undergraduates should be encouraged to participate in international experiences. The alumni placed high priority on the inclusion of two semesters of a foreign language in our curriculum. They also ranked friends as the factor that most influenced them to major in agronomy. Overall 98 percent of the alumni were satisfied with the education received in the Department of Agronomy.

The survey findings also showed that the Department of Agronomy continues to produce job-ready alumni who are prepared to solve complex technical problems in agriculture. However, it was noted that we must continue to develop emerging technology skills for our students in a broader range of

areas. As a result of careful review of each of our options, efforts were made to create a balance of basic and applied course requirements for our undergraduate students. Biotechnology, soil ecology, environmental hydrology, environmental soil chemistry, carbon neutrality, spatial studies, remote sensing, and environmental courses in civil engineering and earth and atmospheric sciences have been added as directed electives in some options. Our department's academic advisors have encouraged students to enroll in a broader range of policy and social science courses that relate to agricultural and environmental topics. Education in hazardous materials handling and occupational health and safety are now available to students through the NRES curriculum.

As part of the continuing review process, graduating seniors are surveyed annually about their courses, quality of instruction, and advising. Their recommendations are reviewed by the department head and transmitted to the teaching faculty for appropriate action. This past year the Department Advisory Committee was asked to interview our undergraduate students to learn about the strengths and weaknesses of the programs and make recommendations based on their experiences and observations (Appendix I.6). One of the specific recommendations was that the department Web site be improved related to its recruitment objectives since most students said the Web was a major factor in directing them to the department along with alumni and family. Revisions have been made and student feedback is continually requested related to the Web site's effectiveness. More improvements are still needed. Students were very complimentary of the faculty-based counseling system and the secretaries that support advising. Students were very pleased with the instruction received in the Agronomy Department from both faculty and graduate teaching assistants and with the quantity and quality of internships. Deficiencies were noted in computer skills, especially Excel, lack of knowledge by the students about the new Leadership Certificate Program, and the need for a more progressive internship program (a second internship building on the first). Each of these deficiencies is being addressed either by advising or by changes in course content. Access to computer resources, internships, and research experiences was indicated to be very good.

As part of a College of Agriculture initiative, the college faculty as a whole and the faculty from each department have developed learning outcomes for their educational programs. Ways to assess these outcomes is a continuing process and each department is working to identify overarching outcome assessment techniques in areas such as quantitative skills, communication, and critical thinking. Discussion of these activities and assessments can be found in Appendix I.7, Outcome Based Program Improvement.

Since the last review, the college and the university have restructured educational opportunities for students interested in environmental science. Purdue conducted an extensive review of the university's academic and

research environmental programs. The review team concluded that Purdue has excellent depth and breadth in this area, but the various programs across campus were very poor at communicating with each other. More than a dozen environmental majors are available, but students have struggled to find information about these programs. College of Agriculture faculty played a significant role in making changes to address these problems. In 2004, the College of Agriculture faculty elected an Environmental Science Steering Committee that represented all interested parties in the College of Agriculture and included three Agronomy faculty (John Graveel, George Van Scoyoc, and Linda Lee). Dr. Lee was elected chair of the steering committee. A “Freshman Environmental Studies Program” (preES) was proposed which Dr. Lee helped launch in 2006. She now serves as a co-chair for this program along with Dr. Paul Schwab (Agronomy). The new pre-Environmental Studies Program (preES) has resulted in increased communication about environmental curricula at Purdue and serves as a portal for freshmen entering the university who have an interest in studying the environment. During their first year on campus, the students receive academic advising specific to their interests and are enrolled in an orientation class that exposes them to all the environmental majors on campus. These students are given a full year to acquaint themselves with the options available to them. By the time they enroll for classes for their sophomore year, they will have chosen a major and will have found an academic advisor within that major. One of the programs which is of interest to many students is the Natural Resource Environmental Science Program (NRES) which is an interdisciplinary curriculum in the College of Agriculture. Dr. Schwab is its director. The NRES program has approximately 65 students.

Recommendation 3: Using instructional technologies to enhance learning

An Educational Technology Committee was established to assist faculty with incorporation of new instructional technologies into their courses. Student response devices (clickers) are now being used in a number of undergraduate lecture courses: Soil Science, Forest Soils, Environmental Sciences, Soil Ecology, Soil Fertility, Crop Adaptation and Distribution, and Agriculture 101 (a college orientation course taught by an Agronomy faculty member). Clickers allow instructors to solicit real time student responses to questions posed during class. Instructors can gauge the level of understanding of concepts presented and adjust discussion accordingly. Overall student reaction to this new learning tool has been very positive. In AGRY 255 and 365T the use of clickers has increased both course and instructor evaluations and in AGRY 365T course grades have improved. This tool is also being used by extension faculty and by faculty conducting outreach programs for Certified Crop Adviser and Golf Course Management workshops. Adobe Connect and Poly Com are being used by several faculty to bring guest lecturers to their classes from universities in Kenya, Hungary, Afghanistan and universities in the U.S. This allows our students to experience new ideas

and perspective not available from our own faculty. This tool is also being used to provide “On-line Tutoring” to students in the late evening as they prepare for exams and do homework assignments. Recording of these sessions allow all students in the class to obtain assistance even when they cannot attend the synchronous virtual help session or a campus-based help session. As a result of its success in Agronomy, the College of Agriculture has adapted on-line Adobe Connect tutoring for use by upper level honors students to assist incoming, at-risk students with calculus courses.

Adobe Presenter along with Blackboard Vista have been used to develop our first distance learning course (AGRY 210Y, Turfgrass Science), and it is used to present the weekly learning modules in the Soil Science and Forest Soils courses and provides the delivery method for supplemental units for the Soil Fertility course, the Soil Science Honors course, and several outreach programs. These asynchronous, Internet accessible modules provide students and extension audiences the opportunity to obtain information in ways that scheduled classroom sessions do not. In the Crop Production course, SMART Board technology has been introduced to help deliver course content and to increase hands-on learning opportunities for the students. Blackboard Vista is used by most faculty to manage their courses and deliver course resources to students. The university provides excellent workshops to support faculty use of the Student Response System (CPS), Blackboard Vista, Adobe Connect, and Adobe Presenter. Based on the success of these technologies in undergraduate courses, extension has begun to utilize them in their programming to provide greater access by clientele to educational material, access clientele data, and improve audience interaction (see Extension Education document).

Over the past four years, we have collected and developed a set of digital map layers for Tippecanoe County that we take into the field in some of our courses. The maps are loaded into a Geographic Information System (GIS) and are viewed on rugged tablet PCs equipped with Global Positioning System (GPS) receivers so that the viewer always knows his or her exact location on the map as they move across the landscape. Our focus is to teach students how soils and landscapes vary spatially over many different scales, and how the soil geomorphic concepts illustrated with diagrams in the classroom correspond to actual features observed in the field. Students can zoom out for an overview and zoom in to see details. By using this technology students can quickly access landscape topography, soil parent material, soil drainage class, pre-settlement vegetation, and other maps, thereby learning how the soil that they just examined in a pit is distributed over larger areas than they can see from their current location. In the fall of 2005, we began teaching with GIS in AGRY 565 (Soil Classification, Genesis, and Survey) using 3 tablet PCs. We now have 14 tablet PCs and are incorporating them into other courses (AGRY 105 and AGRY 255). Funding for much of this initiative came from the College. Pre- and post-tests using this technology by

our students has shown significant improvement of their understanding of observed landscape features on field trips.

Building on our success in teaching with GIS using the tablet PCs, we recently began a project entitled, Integrating Spatial Educational Experiences (Isee) into Crop, Soil, and Environmental Science Curricula, that is funded by a USDA Higher Education Challenge grant. This project has two goals: (1) Develop the ability of our students to use geospatial information to understand how and why soils and landscapes vary spatially at scales ranging from individual fields to a region as large as the state of Indiana. (2) Develop our students' understanding as to how the spatial distribution of soils and landscapes affects the distributions of crops, cropping systems, land use, and environmental and natural resource issues across the state. A major task will be to develop Isee, a Web-based geographic information system that will allow students to access a large variety of maps (data layers) for any area of Indiana using a modern geobrowser such as Google Earth. We will then use Isee to integrate spatial educational experiences into our curricula, focusing on our beginning undergraduate courses.

A new campus Instructional Technology Certificate for graduate students provides a systematic process by which graduate teaching assistants can become knowledgeable in the use of appropriate digital technology for outreach and resident instruction. Our TAs have been encouraged to participate in this program and develop new instructional resources for students in our undergraduate courses. The Graduate Professional Presentation course (AGRY 596) also provides TAs and other graduate students the knowledge needed to create their own Adobe Connect and Adobe Presenter learning modules and provides skill in research conferencing techniques.

Recommendation 4: Leadership, research and internship opportunities for students

The College of Agriculture has created a Leadership Certificate Program for undergraduate students (Appendix I.8). This program has students prepare a personal development plan that leads to improved leadership ability and an understanding of the importance of community service which are specific outcomes we desire for our students. Several of our faculty and students have participated in this program and the numbers involved are increasing. In 2004, the department established an Agronomy Ambassadors Program to complement the College of Agriculture Ambassadors Program. The goal when creating the program was to encourage more Agronomy students to be involved in leadership opportunities. Students interested in the Agronomy Ambassadors Program must apply, be interviewed, and then selected for the position. Once selected they all go through an orientation program where they are taught leadership skills, etiquette, and communication skills. They are

also given an in-depth introduction to the university, college, and department faculty, facilities, and programs. Agronomy Ambassadors are given the opportunity to represent the department and their future profession by meeting key industry partners, distinguished alumni, visiting scientists, and potential students and their parents when they visit the department. The Agronomy Ambassadors Program helps students grow in confidence, develop new skills for interacting with groups of people from many backgrounds, and serve their profession and the university.

The department has four clubs that provide students with excellent opportunities for developing leadership and interpersonal skills: Soil and Water Conservation Club, Turf Science Club, Agronomy Club, and the interdepartmental Environmental Science Club (ESC). The Soil and Water Conservation Club-Purdue Chapter is a joint program of Purdue students, graduate students, staff and faculty, and community interested persons. The Purdue student members host monthly meetings and select guest speakers who discuss current topics related to conservation and future employment opportunities. These programs provide not only information but also excellent networking opportunities for the students. The students attend district and state meetings and, because of their involvement, several of our students have been recipients of the “SWCD Scholarship”.

The Turf Science Club provides an opportunity for the turf students to learn from guest speakers, tour different turf grass facilities, attend national conventions and regional turf grass expos, and socialize with other students. Many of these students are also members of the Turf Bowl Teams who prepare weekly during the fall semester for a comprehensive turfgrass science exam at the annual Golf Course Superintendents Association of America (GCSAA) and Sports Turf national meetings where they compete with other universities.

The Purdue Agronomy Club is one of only a few clubs on campus that meet every week of both semesters. They are extremely active. Each month they have a work session making Munsell charts, pH kits, soil texture kits and plant mounts and seed ID kits for schools and universities to use in their educational programs and judging teams. They host guest speakers and have a function each semester for the department; in the fall it's the White Elephant auction with all proceeds going to a charity and in the spring it's the international feast which brings graduate students, undergraduate students, and faculty together for an international meal and an opportunity to learn about traditions and cultures from around the world. They have a semester tour which has included in recent semesters: Fair Oaks Dairy, Tate & Lyle, Linden Ethanol Plant, Farmers Forage Research, and various Ag businesses in the area. They are active in the national SASES organization (student organization of the American Society of Agronomy, the Crop Science Society of America, and the Soil Science Society of America). This year the national president was

Eric Miller from Purdue. They have placed as one of the top four clubs every year in the national poster contest since its inception in 2001. Purdue has had the first place speech contestant in both the soil conservation and SASES competitions two years out of the last five. All of these experiences increase our students' understanding of their chosen profession, provide excellent networking opportunities, and enhance their communication and leadership skills.

As part of the Agronomy Club, the Soils and Crops judging teams increased in numbers these past years and both teams always compete well. The Crops team practices each Tuesday and Thursday of the fall semester and competes in a regional competition for practice before competing with the other land grant universities in Chicago and Kansas City. The soils team practices each Saturday morning during the fall semester and all students compete in the Midwest regional. Purdue has been in possession of the traveling trophy since 2004. The soils team splits into two teams in the spring with some students competing in the NACTA contest and the others in the SASES competition. Each fall the crops and soils teams help the Agronomy Club host the High School Soils and Crops Judging Invitational competitions with about 400 soils contestants and 110 crops contestants.

The ESC attracts students from a wide range of disciplines including civil engineering, science, and health sciences to name a few. Club activities center around environmental issues such as the "Green Initiative", "Adapt a Highway", and "Detrash the Wabash". The ESC is involved in various recycling efforts on campus including organizing an effort in dormitories to recycle batteries.

As chair of the College Honors Committee, Dr. Van Scoyoc, helped to implement the Dean's Scholars program for incoming students four years ago. This program complements the existing Honors program which students usually begin during their junior year (Appendix I.9). Each of these programs requires undergraduate research by the student under the direction of a faculty mentor. Since the last review many of our students have used research as their capstone experience and a number of them have taken new honors courses which have been developed in the college. Several publications, posters and oral presentations at national meetings have resulted from these activities. In the past two years, undergraduate students have received more than seven awards at university or national meetings for their research accomplishments. Faculty are also active in employing students in their research programs where students gain insight into how science is conducted and often become motivated to attend graduate school. Out of 43 students nationally that have been selected to be part of the Crop Science Society of America's Golden Opportunities program, we have three of these students in our department.

As previously mentioned, all of our students participate in intern experiences. These experiences provide many students with employment opportunities following graduation. Our students have approximately a 95 percent employment record four months following graduation, similar to that of the college. This compares with 85 percent for the university.

3. Program focus: Developing tomorrow's leaders

In the following sections we will provide examples of how our programs work to address the nine developmental focus areas presented in our mission statement for our undergraduate education program.

a. Technical expertise and its application (70 percent of course requirements)

The nine options in the department address the areas of technical competencies which we emphasize for our graduates:

Agronomic Business and Marketing
Plant Genetics and Plant Breeding
Soil and Crop Science
Soil and Crop Management
Turfgrass Science
Applied Meteorology
Environmental Soil Science
International Agronomy
Associate Degree – 2 year

The department offers 64 undergraduate courses (Table 3.7) to meet the agronomic learning outcomes for the above options. Almost half (47 percent) of these courses provide laboratory and/or field experience. The department's laboratories are well equipped and provide students the opportunities to conduct complex analyses in their courses and participate in undergraduate research. The W. H. Daniel Turfgrass Research and Diagnostic Center and the Agronomy Center for Research and Education (ACRE) provide excellent facilities for class field trips and opportunities for practical learning experiences. The Diagnostic Training Center at the ACRE provides a truly unique opportunity for faculty to photograph agronomic situations that one might need to travel the state over a period of years to observe. It also provides an excellent place for students to work and learn diagnostic techniques first hand.

The department supports a Soils Resource Center which is mostly used by the AGRY 255/270, Soil Science and Forest Soils, courses and contains educational materials and some tutoring for other

courses - Soil Fertility, Soil Physics, Soils and Land Use, Soil Conservation and Management, Environmental Hydrology, Soil Chemistry, and Environmental Soil Chemistry. The Crops Resource Center is mostly used for AGRY 105, Crop Production, and supports courses in World Crop Adaptation, Seed Analysis and Grain Grading, Crop Production Systems, Professional Turfgrass Systems, and Turfgrass Science. Both Resource Centers have gone under major renovation and updating and use computer-based learning modules (new since the last review) along with hundreds of hands-on displays and laboratory experiments to create very interactive learning environments. The Crops Resource Center has more than 200 seeds and 45 plant specimens for identification and the Soils Resource Center houses more than 300 soil monoliths which are used as part of the instruction in many of the soils courses. This monolith collection is the largest in the U.S. and has been cited by many graduate teaching assistants from other universities as the resource that helped them understand soil concepts they had only experienced in textbooks.

b. Communication and interpersonal skills

There are a variety of activities in and out of the classroom that help our students develop communication and interpersonal skills. Each student takes basic composition (3 credits) and an additional upper level writing course (i.e., Business Writing, 3 credits). In addition they take public speaking and in several of the options students take additional writing and speaking courses. All students in the senior seminar class must complete a videotaped interview with a professional human resources person. A critique is then provided and each student must write a report outlining how their interviewing skills could be improved. Student course evaluations indicate that this experience has helped them significantly when they are interviewed by employers. In many of the courses, group projects are required with grades being determined not only by the final report but by team members evaluating the contributions of each team member (i.e., World Crop Adaptation, Contemporary Issues in Agriculture, and Crop Production). In the capstone course for the Turf Science option, students develop comprehensive management plans and budgets for different turfgrass use areas. These students then orally present and defend their plans to actual industry members. With almost half of our courses having laboratories or field experiences, students regularly write laboratory reports or provide field notes that are reviewed, not just for scientific content, but also for format, spelling, and sentence structure. Most courses also have significant essay components to their exams and many have multiple reports on various topics. Every student is required to take Soil Science where students

participate in weekly discussions and are required to write answers to open-ended essay questions, discuss and share their responses within assigned groups, and finally teach the concepts to the other members of the class. Service learning projects in several of our courses require group projects that meet community needs. Students develop both oral and written reports to share with the not-for-profit organization for which they did the project. This fall semester students in AGRY 565 developed educational materials (posters and brochures) that will be used in displays and for walking tours at the Lilly Nature Center at Celery Bog in West Lafayette. Students participating in undergraduate research gain ability in formulating hypotheses, conducting scientific experiments, and learn to present their work in both written and oral formats. Many projects result in popular press or refereed publications.

c. Appreciation of social sciences, humanities, and the arts

Twenty-four credits (18 percent of graduation requirements) of each student's curriculum are devoted to social sciences, humanities, and the arts. Nine credits in these areas must meet the college's international understanding requirement and an additional three credits must meet the college's multicultural awareness requirement. Many students use foreign languages to meet these requirements. In several of the capstone courses selected historical and literary documents are read to provide perspective on what students are learning today. For example, Dr. Steinhardt in his capstone course on land use requires students to read the Magna Carta, Mayflower Compact, Law of the Indies (abridged), Declaration of Independence, Land Ordinance of 1785, Northwest Ordinance of 1787, the Constitution of the State of Indiana and the Constitution of the United States as well as selected topics from the book "The City Beautiful Movement." These documents and books provide a basis for how U.S. citizens view land ownership and government's role in land use decisions. In addition, he requires a book review in both of his advanced undergraduate courses from titles such as "A Sand County Almanac" by Aldo Leopold, "The Geography of Nowhere" by James Howard Kunstler, "Design with Nature" by Ian McHarg, "The Wilderness Mind" by Roderick Nash and "Truth, Knowledge or Just Plain Bull: How to Tell the Difference" by Bernard M. Patten. These books provide insight into the importance of soils to society and the role conservation plays in preserving it. Other Agronomy courses include references to the arts to enhance the students' learning experience. As an example, Dr. Schweitzer utilizes the paintings of Pieter Brueghel the Elder (The Harvesters, 1565), George Stubbs (The Reapers, 1785) and Thomas Hart Benton (Threshing Wheat, 1938-39) to illustrate the history and aesthetics of wheat management as

prologue to his discussion of modern wheat management in the Crop Production Systems course. At the annual Spring Fest, Agronomy students teach guests of all ages how to make pictures using paints that are made from soil materials such as iron oxides and organic matter. Many of these materials were used by early civilizations to create art which shared their cultures with future generations.

All departmental study abroad courses involve cultural, historical, and art related readings prior to and during the course. Students are required to keep a diary of their daily experiences.

d. Leadership and teamwork skills

Four student clubs provide many leadership opportunities for Agronomy undergraduates through officer positions, committee chairmanships, involvement in K-12 outreach programs, and service projects in the community. The college and Agronomy Ambassador programs give students the opportunity to represent their profession to potential students and their families, visiting scientists, and other guests as they develop communication and leadership skills. As already mentioned, the College Leadership Certificate program provides a detailed process by which students can improve their leadership and teamwork skills under faculty mentors. The Agronomy Club has been very active at the national level. This past year's SASES president was from Purdue and next year the corresponding secretary is from Purdue. We have had two national program chairmen and again this year we have two. Students involved in the Turf Science Club compete in the Sports Turf Managers (STMA) and Golf Course Superintendents Association of America (GCSAA) annual Turf Quiz Bowl competitions and are well recognized nationally for their efforts. In February 2003 and 2004, the team placed second out of nearly 70 teams from turf programs across the United States in the GCSAA competition. In 2005 all three undergraduate teams placed in the top eight out of 83 teams entered. In 2006 one team won the STMA competition and all three teams attending the GCSAA competition placed in the top four places out of 80 teams. In 2007 five teams attended the GSCAA competition and placed 2nd, 3rd, 4th, 17th and 21st out of 81 teams from across the United States. These students take a great deal of pride in these competitions and it is clear that students graduating with the ability to work in a team and diagnose and solve problems are in high demand by employers. The Soils Team has won the Regional competition since 2004 and this year the Crops Team placed 3rd in Chicago and 4th in Kansas City competitions. All of these activities develop leadership, teamwork, and communication skills in addition to developing technical expertise.

In the Senior Seminar capstone course, students participate in a learning style assessment. Staff from the Center for Instructional Excellence help the students understand how their style of learning impacts the way they interact with others in teams. In this course, an expert in leadership from the Department of Organizational Leadership and Supervision at Purdue conducts an exercise in teamwork and discusses the skills of good leaders and effective team members.

e. Ethical practices

In both our freshman and senior seminars there are programs on ethics and the importance of honest and ethical practices in the workplace and in dealing with every person. Understanding how ethics is impacted by one's world view is discussed. All students involved in undergraduate research are instructed by their faculty mentors in ethical scientific practices. Each course stresses in its syllabus the impact of academic dishonesty in the student's course grade and the importance of each student maintaining integrity and honesty in relationships with other students in the class. All faculty are encouraged to treat each student with respect and fairness and hopefully by doing this they provide an example of ethical behavior. Advisors to the department's clubs and judging teams spend many hours working with individual students and have a significant impact on our students' understanding of honest and ethical interactions by the way they exhibit these characteristics.

f. Business and management skills

Eighteen to 28 percent of the graduation credits for each of our options require Economics, Agricultural Economics, or Management courses. In the Senior Seminar capstone course, students are provided information about investing, budgeting, credit, diversification of assets, and the importance of compounding in saving for the future. This is one of the topics in that course that receives the highest rating each semester. The Agronomy Club sells a variety of agronomic products to county and high school educators. This provides some of our students with entrepreneurial experience. One hundred percent of our students participate in internships, many of them with major agricultural companies that market a wide array of products and services. The university offers an entrepreneurial certificate curriculum that we encourage students to consider as either the complete program or by taking individual courses.

The Department of Agronomy initiated a highly successful university-

wide student competition to foster innovation, invention and interdisciplinary team problem solving in the development of new uses for soybean. Winning innovations have received national news coverage and have included soy crayons (now commercially produced and distributed as Prange Earth Colors), soy birthday candles, soy lip balm, biodegradable ski wax, soy-derived hydraulic oil, and soy breakfast cereal. Student team creativity and innovation have been rewarded through valuable professional experience and exposure as well as through significant monetary awards. This annual competition continues on campus, now administered by Purdue's Indiana Soybean Development Council endowed professor in soybean utilization, a member of the Agricultural and Biological Engineering faculty.

Student internships provide excellent opportunities for students to learn about business and management skills in the work place. Many students not only help with product development but also learn about the advertising and marketing of products. These experiences do much to help the students better understand the interdependency of research, product development, marketing, and consumer relations. These experiences also motivate students in their studies when they return to campus because they see the importance and application of their course work.

g. International and cultural understanding

In 2006 the College of Agriculture adopted a Multicultural Awareness requirement. A College of Agriculture course was developed, AGR 201 (Communicating Across Cultures), to provide support for this requirement. In addition to this course, there is an elective list of multicultural courses from across campus that students can choose from to meet this requirement (Appendix I.10). Obviously, one course is not enough to make a student completely sensitive to the many issues that relate to multiculturalism, but it is a start. Students learn about the value of opening one's mind to other cultural ideas and topics they may never have before encountered or thought about. Agronomy offers a course, AGRY 350, Global Awareness, where graduate students and faculty from many countries are asked to speak to and dialogue with the students about the agriculture, culture, history, geography, political situation and contemporary issues within their home country. Adobe Connect has been used to bring an international scientist into the classroom from a remote location. This course is very popular and has an enrollment of approximately 75 students each year.

Dr. Housley teaches World Crop Adaptation which meets one of the College's International Understanding requirements. This course,

with enrollments annually of 90, provides students the opportunity to learn about the agriculture of developing countries and about the social and political factors that affect production. Students work in teams and conduct research to determine if a major grain marketing company should open operations in a given country. These teams then make PowerPoint presentations to Agronomy faculty regarding their conclusions and the justification for their decisions.

International graduate students in the department are encouraged to participate in teaching undergraduate courses. Currently there are four students representing the countries of Honduras, Dominica, Haiti, and Pakistan. These students provide exciting and unique perspectives for our undergrads and for the faculty with whom they work.

Since 2002 the department has offered six study abroad courses which include study of the agriculture, cultures, history, and geography of Ireland, Honduras, England, Wales, the Netherlands, France, Italy, Hungary, and Romania. In addition, the college supports annually six or seven Maymester courses and numerous semester- and year-long programs that are available to our students. The Big Ten Universities plus the University of Chicago offer a broad selection of courses that Purdue students can participate in around the world. Although some scholarships are available (approximately \$300-\$500 per student), more financial support is needed if we hope to increase the study abroad activities of our students.

Almost every faculty member of the department has an active international program either tied to their research interests or to institution building within another country. These faculty serve as valuable resources for programming in our departmental student clubs. Many faculty also host international scientists and these scientists work with graduate and undergraduate students on research and are often involved with undergraduate courses, either as guest lecturers or as students. This is a tremendous opportunity for our students to learn more about other cultures from these individuals without the expense of travel to other countries, and it shows them how many of the issues we study in our courses have relevance to others around the world.

h. Personal and social responsibility

Students in each of our clubs provide service projects to the community and many of the students work with Sherry Fulk-Bringman and Suzanne Cunningham in delivering outreach programs to teachers and students around the state. The Senior Seminar

capstone course requires all students to conduct a community service project and each student attends one government planning/decision making meeting within the community. Both assignments require preplanning and follow-up written reports discussing, not only the experience, but also the value it had for the student in understanding involvement in the community.

The Agronomy Club provides service to Agriculture Educators around the Midwest by selling plant mounts, seed and soil samples, and soil testing materials. These products are critical to many of the high school and Extension education programs. Proceeds from these activities help the students with travel to professional meetings and support some of their service activities in the community.

Several courses have service learning components that help students understand the importance of contributing to their communities. In AGRY 565 students have worked with Historic Prophetstown, a local living history museum, to develop soil maps and interpretative material that are used for planning further expansion of the 1920's farmstead and for training of docents. Students have also developed materials interpreting soils and landscapes that are used in the Lilly Nature Center located at the Celery Bog Nature Area run by the West Lafayette Parks and Recreation Department.

As previously mentioned the Agriculture and Agronomy Ambassadors' programs provide not only leadership skill for our students but also show the importance of contributing to the departmental mission through service.

i. Motivation and abilities for continued learning

One of the most powerful ways in which the department provides motivation for continued learning is through its quality of instruction. As mentioned earlier, our faculty are some of the most recognized in the University and in our professional societies for providing outstanding learning opportunities for students. Five of our faculty are members of the 125-member, University Teaching Academy, and nine are listed in the Book of Great Teachers at Purdue (out of a total of 314 honored since 1869). Leadership of the Purdue University Teaching Academy has resided in the Agronomy Department for four of the last six years. Five of the current faculty and one recent retiree have all been recognized by the American Society of Agronomy with its Agronomic Resident Education Award. Three of these faculty have received the Crop Science Teaching Award and three have received the Soil Science Teaching Award from the Crop Science Society of America and the Soil Science Society of America,

respectively. One faculty member has just completed a five-year term as editor of the *Journal of Natural Resources & Life Sciences Education*, the peer reviewed education journal of our profession, and another has held major leadership responsibilities in the development of the Certified Crop Advisers Program. The students recognize the faculty commitment to teaching and learning and appreciate it as evidenced by the overall course evaluations received by courses and instructors in the department, by their 98 percent approval rating in our last alumni survey, and by the almost unanimous approval rating by the students in their Senior Seminar exit interview for Agronomy courses. Students who have had positive learning experiences and who have been taught by faculty that are excited about the subject matter are more likely to have a continued interest in learning.

The ability for graduates to pursue continued learning comes from a strong curriculum and opportunities while at Purdue to learn from multiple formats and from a wide variety of sources. The learning experiences for our students are not one dimensional. Case studies, discussion sessions, team projects, lectures, laboratory experiences, self-paced learning in our Resource Centers, Internet-based learning opportunities, class presentations, service learning, and one-on-one tutoring all provide a student the perspective of the multiple ways in which learning can occur. In all of our courses, we encourage students to continue using our Web-based resources and those supplied by our Extension staff throughout their lives. Learning does not stop with the degree nor does it end the connectivity of the student with our department! The experiences leading to the degree hopefully have provided the basis and motivation for continued learning.

C. Where we want to go

At the department retreat on October 26, 2007, the faculty listed the following priorities for Teaching and Learning:

1. Maintain the sense of a shared mission to the scholarship and value of teaching in the department

- a. Continue to support a core of faculty dedicated to undergraduate education and foster developmental programs that result in quality instruction by all faculty.
- b. Expand our already strong graduate teaching assistant program so as to impact education of agronomy undergraduate and graduate students in universities around the world.
- c. Provide strong financial and personnel support for both the Crops Resource Center and the Soils Resource Center. (These provide

excellent interactive learning environments for our students and are great teaching resources for the faculty.)

- 2. Continue to provide a strong, forward-looking and innovative undergraduate education program that attracts a diverse, high-quality student body**
 - a. Create dynamic curricula that provide graduates the ability to adjust to an ever changing world.
 - b. Provide opportunities for students that encourage community involvement and service.

- 3. Develop educational programs that reach beyond the campus through K-12 education, distance education courses, and other Internet-based learning resources**
 - a. Institutionalize the K-12 outreach program and improve feedback mechanisms that will improve efficiency and effectiveness.
 - b. Develop at least 2 more distance education courses in the next 2 years.

D. How we will get there

Based on the above priorities established by the faculty, the following future directions and strategies (lettered) are recommended.

- 1. Maintain the sense of a shared mission to the scholarship and value of teaching in the department**
 - a. Review our Departmental Strategic Plan – Preeminence in Undergraduate Education – 2004-2009 (Appendix F) /Assess which goals have been achieved, which need to be deleted, and what new goals and strategies must be included.
 - b. Maintain a core group of faculty with greater than 60 percent of their appointment focused on undergraduate education (minimum of two in soils and two in crops).
 - c. Clearly articulate criteria for promotion and merit raises based on the scholarship of teaching and service to students.
 - d. Continue to involve new faculty in student advising and provide adequate support for these activities through weekly meetings and semester advisor workshops on registration procedures.
 - e. Ensure that each departmental research group is represented on the Department Curriculum Committee.
 - f. Have regular review (every five years) of each course syllabus by at least two faculty closest to the discipline (to be assigned by the

- teaching coordinator in consultation with the department head and the faculty member).
- g. Institutionalize a formal peer evaluation system for courses and faculty to be used with the existing university student evaluation system.
 - h. Foster an environment that assists and encourages acquisition of external funds for curriculum and course development. (Since the last review approximately \$825,000 has been obtained to support instruction and course development.)
 - i. Encourage publication of instructional research by faculty with support of the assessment office in the Center for Instructional Excellence to feature the scholarship of teaching that occurs in our department. (In addition to publications listed on faculty biographies, more than 35 presentations have been given by faculty at national and international conferences related to teaching in the last five years.)
 - j. Each semester meet with graduate teaching assistants about the opportunities for teaching in the department and make them aware of the CIE Graduate Teacher Certificate Programs and university recognition opportunities. Be sure all Agronomy graduate students are encouraged to teach and those students desiring to teach receive the opportunity.
 - k. Continue to provide funding and personnel for the Soils and Crops Resource Centers and expand their role in support of additional courses and faculty.

2. Continue to provide a strong, forward-looking and innovative undergraduate education program that attracts a diverse, high-quality student body

- a. Continue to review curricula on a rotating basis with each option being reviewed every four years.
- b. Conduct alumni surveys focused on students who have been out for only a few years. Target years could be: 2, 5, 10, and 20. Find out what helped them the most with their employment and what could have been helpful.
- c. Improve assessment methods for the current and future student outcomes that are being developed (Appendix I.7).
- d. Develop a new option in Soil and Hydrologic Sciences (perhaps replacing Environmental Soil Science) that will emphasize courses in soil physical sciences, pedology and water movement at landscape and watershed scales. The technical curriculum would emphasize surface and subsurface hydrology, soil science, land use, land surface modeling, geo-spacial and information tools, and water quality.
- e. Assess how the six Grand Challenges for research in the department are being addressed in our curriculum and develop a plan to feature these challenges in our courses.

- f. Assess how our curriculum can better prepare students to address public policy issues.
- g. Develop a program for students to take appropriate certification exams prior to graduation (these have been currently established for Certified Crop Advisors Exam and HAZWOPER Certification).
- h. Establish greater diversity (students, graduate teaching assistants, and faculty) by strategically allocating resources for recruitment at historically Black and Hispanic universities and by visiting with under-represented persons who may not normally think of agriculture for a career choice.
 - i. Evaluate the effectiveness of our current paper and Web recruitment materials and work to become more effective with these techniques.
 - ii. Considering the Hispanic population in Indiana and in the local community, a greater focus on recruiting students from this population needs to be made.
- i. Work closely with Vincennes University and Ivy Tech Community College to support the faculty teaching Agronomy courses at those institutions, visit their classrooms to recruit potential students, and assist students with an easy matriculation to Purdue, (i.e., invite local Ivy Tech students interested in agriculture to participate in club activities and other departmental programs at Purdue).
- j. Continue to evaluate the benefit of and, where appropriate, expand the use of instructional technologies such as Blackboard, Adobe Connect, Adobe Presenter, SMART Board, and student response devices (CPS) for existing and future courses.
- k. Improve retention and graduation rates of our students by providing academic support, career counseling, and networking with upper level undergraduate students.
 - i. Provide mentoring and tutoring to incoming students through the new college math tutoring program and by establishing a program where upper level students mentor incoming students. These support programs can begin in AGRY 101, the new Agronomy orientation class.
 - ii. Better familiarize all faculty with University Career Counseling programs and encourage advisors to have students utilize these resources, as needed.
 - iii. Encourage students to participate in learning communities organized at the university-level.
- l. Continue to increase department scholarships for undergraduate students – academic, needs-based, travel, and study abroad. (Annual departmental scholarships have increased from \$27,000 in 2002 to \$57,000 in 2007.)
- m. Increase undergraduate admission standards and promote higher standards for high school graduation within Indiana (currently being done by a university initiative with college input).

- n. Ensure that research opportunities exist for the expanded group of Dean's Scholars entering Purdue and encourage research experiences for more of our students. Have regular departmental meetings of these students so that they can socially network as well as share research experiences – a recommendation recently made by our current Dean's Scholars.
- o. Take advantage of our 3+2 B.S.-M.S. program and encourage more high achieving students to participate – target high achieving students in the second semester of their sophomore year and have the graduate chair and selected faculty meet with them. Stipends need to be provided by the department to support these students.
- p. Continue to develop more writing, speaking, case study, and service learning opportunities in our courses – encourage faculty to attend workshops on these topics and invite seminar speakers to the department who have successfully utilized these pedagogies to produce quality learning environments.
- q. Offer a sustainable food systems minor across the college and university and develop a cornerstone course to support this minor. This minor is currently being studied. (This will allow the department to contact a broader audience to tell the “agronomy story” and increase our student contact hours.)
- r. Improve students' abilities to understand spacial and scale relationships in all of our courses (a number of courses are already working on this initiative; one grant has currently been received for this activity).
- s. Expand international and cultural understanding for our students through new study abroad courses and international intern and entrepreneurial opportunities.

3. Develop educational programs that reach beyond the campus through K-12 education, distance education courses, and other Internet based-learning resources

- a. Improve, restructure, and make more efficient our K-12 outreach programs.
 - i. Develop summer workshops for teachers that fit their curricular needs.
 - ii. Identify funding sources for these activities.
 - iii. Develop assessment tools to determine the effectiveness of these programs.
 - iv. Evaluate our current Web presence for K-12 outreach and revise the site as needed.
- b. After conducting a needs assessment, increase the number of distance learning courses offered by the department – both credit and non-credit. Assist faculty with funding opportunities and encourage

- faculty to work together in the development of these courses. Two new distance education courses are currently in development.
- c. Assess the opportunity to offer all or portions of Agronomy courses to Ivy Tech Community College through distance education modules – this could strengthen the quality of their courses and provide excellent networking opportunities with their faculty.
 - d. Expand the use of instructional technologies such as Blackboard Vista, Adobe Connect, and Adobe Presenter for reaching campus-based and non-campus-based students with interactive learning modules, on-line tutoring, and accessibility to content experts from around the world.

Table 3.1. Number of undergraduate students by option in the Agronomy Department, 2008-2009

| Academic Options | # of students |
|-----------------------------------|----------------------|
| Agronomic Business and Marketing | 33 |
| Plant Genetics and Plant Breeding | 19 |
| Soil and Crop Science | 14 |
| Soil and Crop Management | 21 |
| Turfgrass Science | 58 |
| Applied Meteorology | 18 |
| Environmental Soil Science | 2 |
| International Agronomy | 2 |
| Associate Degree – 2 year | 1 |
| Total Students | 168 |

Table 3.2. Diversity of undergraduate students in Agronomy

| Year | Number of Students | M | F | Ethnic Group | | | | Int'l Students |
|---------|--------------------|-----|----|--------------|----|----|----|----------------|
| | | | | AF | AA | HA | NA | |
| 2001-02 | 176 | 143 | 33 | 2 | 2 | 1 | 0 | 1 |
| 2002-03 | 170 | 147 | 23 | 1 | 0 | 0 | 0 | 0 |
| 2003-04 | 164 | 139 | 25 | 1 | 0 | 1 | 0 | 0 |
| 2004-05 | 156 | 136 | 20 | 1 | 0 | 1 | 1 | 1 |
| 2005-06 | 146 | 123 | 22 | 2 | 0 | 0 | 2 | 5 |
| 2006-07 | 152 | 127 | 25 | 0 | 3 | 0 | 2 | 5 |
| 2007-08 | 153 | 126 | 27 | 0 | 4 | 1 | 1 | 3 |
| 2008-09 | 168 | 133 | 35 | 0 | 4 | 1 | 0 | 8 |

AF = African American

AA = Asian American

HA = Hispanic American

NA = Native American

Table 3.3. Undergraduate enrollments and faculty teaching FTEs at Purdue and other universities

| University | Enrollment | Three-Year Enrollment Trend | Teaching FTE's |
|--|------------|-----------------------------|----------------|
| University of Illinois-Urbana Champaign – Crop Science | 93 | Steady | 7.6 |
| University of Illinois-Urbana Champaign - NRES | 12 | Steady | 2.0 |
| Iowa State - Agronomy | 149 | Increase | 11.3 |
| Michigan State University - Crop and Soil Sciences | 89 | Decrease | 8.9 |
| Minnesota - Agronomy, Applied Plant Sciences, Ag Industries, Marketing | 58 | Increase | 4.7 |
| Minnesota - Soils, Environmental Science, Policy and Management | 260 | Steady | 5.6 |
| Ohio State University – Crop Science, Landscape Hort. Turfgrass Science, Golf Mgmt. | 220 | Steady | 7.9 |
| Ohio State University – Soils, Environmental Science | 340 | Steady | 13.5 |
| Nebraska - Agronomy, Horticulture | 175 | Decrease | 10.9 |
| Pennsylvania State – Turfgrass Science, Environ. Soil Science, Agroecology | 187 | Increase | 11.8 |
| Purdue - Agronomy | 168 | Increase | 10.8 |
| Wisconsin - Soil Science | 16 | Decrease | 5.4 |

Table 3.4. SAT scores for agronomy, agriculture, and the university, 2001 – 2008

| Year | Department of Agronomy | School of Agriculture | University |
|---------|------------------------|-----------------------|------------|
| 2001-02 | 1099 | 1080 | 1134 |
| 2002-03 | 1072 | 1069 | 1150 |
| 2003-04 | 1026 | 1067 | 1150 |
| 2004-05 | 1087 | 1080 | 1148 |
| 2005-06 | 1038 | 1075 | 1150 |
| 2006-07 | 1060 | 1067 | 1142 |
| 2007-08 | 1105 | 1079 | 1145 |

Table 3.5. Agronomy graduates by option from 2001 to 2008

| Agronomy Graduates | | | | | | | |
|----------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| | 2001-02 | 2002-03 | 2003-04 | 2004-05 | 2005-06 | 2006-07 | 2007-08 |
| AGRON BUSINESS & MARKETING | 4 | 7 | 2 | 6 | 3 | 7 | 3 |
| AGRONOMY | 9 | 12 | 12 | 19 | 15 | 12 | 14 |
| APPLIED METEOROLOGY | | 2 | | 1 | 2 | | |
| ENVIRONMENTAL SOIL SCIENCE | 1 | 1 | | 2 | 3 | | |
| INTERNATIONAL AGRONOMY | 1 | | | | | | |
| PLANT GENETICS & BREEDING | 6 | 2 | 6 | | | 1 | 2 |
| SOIL & CROP MGMT | 4 | 7 | 7 | 13 | 8 | 5 | 9 |
| SOIL & CROP SCIENCE | 4 | 3 | 3 | | 3 | 1 | 3 |
| TURF SCIENCE | 11 | 15 | 26 | 15 | 12 | 8 | 13 |
| | 40 | 49 | 56 | 56 | 46 | 34 | 44 |
| | 2001-02 | 2002-03 | 2003-04 | 2004-05 | 2005-06 | 2006-07 | 2007-08 |

Table 3.6. Agronomy faculty and their instructional appointment

| | | Appointment FTE as of 11/20/08 |
|-------------------------------|-------------------------|---|
| Name | Rank | Instruction |
| Beyrouy, Craig | Professor | .33 |
| Bigelow, Cale A. | Associate Professor | .60 |
| Bowling, Laura | Assistant Professor | .30 |
| Brouder, Sylvie M. | Professor | .05 |
| Crawford, Melba M. | Professor | .15 |
| Ejeta, Gebisa | Distinguished Professor | .20 |
| Grant, Richard H. | Professor | .20 |
| Graveel, John G. | Professor | .35 |
| Housley, Thomas L. | Professor | .80 |
| Jackson, Scott A. | Professor | .20 |
| Jiang, Yiwei | Assistant Professor | .25 |
| Joern, Brad C. | Professor | .15 |
| Johnson, Keith D. | Professor | .05 |
| Johnston, Cliff T. | Professor | .20 |
| Kladivko, Eileen J. | Professor | .25 |
| Lee, Brad D. | Associate Professor | .05 |
| Lee, Linda S. | Professor | .20 |
| Ma, Jianxin | Assistant Professor | .20 |
| Nakatsu, Cindy H. | Professor | .20 |
| Niyogi, Dev | Assistant Professor | .15 |
| Ohm, Herbert W. | Distinguished Professor | .30 |
| Owens, Phillip | Assistant Professor | .10 |
| Reicher, Zachary J. | Professor | .20 |
| Rocheford, Torbert | Professor | .20 |
| Schulze, Darrell G. | Professor | .35 |
| Schwab, A. Paul | Professor | .20 |
| Schweitzer, Lee E. | Professor | .90 |
| Snyder, Lori U. | Assistant Professor | .80 |
| Steinhardt, Gary C. | Professor | .50 |
| Szymanski, Daniel B. | Associate Professor | .25 |
| Tuinstra, Mitch | Professor | .20 |
| Turco, Ronald F. | Professor | .15 |
| Van Scoyoc, George E. | Professor | .85 |
| Volenec, Jeffrey J. | Professor | .20 |
| Vorst, James J. | Professor | .40 |
| Vyn, Tony J. | Professor | .05 |
| Weil, Clifford F. | Associate Professor | .25 |
| | | |
| Total FTE without USDA | | 10.78 |

Table 3.7. Course names, instructors, and enrollments for Agronomy courses

| Course # | Course Name | Instructor | School Year | | Total |
|----------|-------------------------------|------------------------------------|-------------|---------|-------|
| | | | 2001-02 | 2007-08 | |
| 105 | Crop Production | Lori Snyder | 62 | 77 | 547 |
| 110 | Surv of Turfgrass Culture | Cale Bigelow | 23 | 25 | 161 |
| 155 | Intro. Soil Morphology | Gary Steinhardt | 0 | 6 | 21 |
| 204 | Crop and Weed Identification | Tom Housley | 32 | 7 | 76 |
| 210 | Turf Management | Cale Bigelow | 69 | 38 | 313 |
| 210Y | Turf Management (Distance) | Cale Bigelow | 0 | 0 | 26 |
| 211 | Fund. Of Turfgrass Culture | Cale Bigelow | 0 | 22 | 103 |
| 251 | Intro. To Soil Science | John Graveel/ George Van Scoyoc | 6 | 1 | 25 |
| 255 | Soil Science | John Graveel/ George Van Scoyoc | 249 | 236 | 1610 |
| 270 | Forest Soils | John Graveel/ George Van Scoyoc | 40 | 50 | 292 |
| 285 | World Crop Adaptation | Tom Housley | 95 | 89 | 601 |
| 290 | Environmental Science | John Graveel | 3 | 17 | 82 |
| 305 | Seed Analysis & Grain Grading | Tom Housley | 6 | 1 | 26 |
| 306 | Seed Technology | Larry Svajgr | 9 | 12 | 57 |
| 320 | Genetics | Cliff Weil/Dan Szymanski | 263 | 314 | 1975 |
| 321 | Genetics Laboratory | Gregore Koliantz | 97 | 162 | 909 |
| 335 | Weather and Climate | Dev Niyogi | 28 | 36 | 188 |
| 337 | Environmental Hydrology | Laura Bowling | 0 | 18 | 19 |
| 349 | Soil Ecology | John Graveel/ Ron Turco | 0 | 24 | 82 |
| 350 | Global Awareness | Lee Schweitzer | 105 | 73 | 546 |
| 355 | Soil Morphol Geography | Gary Steinhardt | 11 | 1 | 36 |
| 365 | Soil Fertility | Brad Joern | 77 | 44 | 303 |
| 365T | Soil Fertility (Turf) | George Van Scoyoc | 0 | 28 | 103 |
| 375 | Crop Production Systems | Lee Schweitzer | 153 | 124 | 871 |
| 385 | Environ. Soil Chem. | Linda Lee | 8 | 4 | 57 |
| 390 | AGRY COOP Program | Lee Schweitzer | 0 | 0 | 2 |
| 398 | Agronomy Seminar | Lee Schweitzer & Staff | 50 | 53 | 300 |
| 399 | INDIVIDUAL STUDY | Staff | 9 | 16 | 159 |
| 399B | Intro. To Agronomy | Craig Beyrouy | 0 | 0 | 28 |
| 450 | Soil Conserv. & Management | Gary Steinhardt | 9 | 8 | 53 |
| 460 | Contemporary Issues in Ag | Jim Vorst | 5 | 3 | 27 |

Table 3.7. continued

| Course # | Course Name | Instructor | School Year | | Total |
|----------|--|-----------------------------------|-------------|---------|-------|
| | | | 2001-02 | 2007-08 | |
| 465 | Soil Physical Properties | Eileen Kladviko | 8 | 13 | 139 |
| 480 | Plant Genetics | Herb Ohm, Scott Jackson | 21 | 2 | 49 |
| 498 | AGRY Senior Seminar | George Van Scoyoc | 40 | 32 | 256 |
| 499H | Honors Thesis Research | Staff | 0 | 1 | 2 |
| 505 | Forage Crops and Mgmt | Jeff Volenec | 22 | 20 | 100 |
| 510 | Turfgrass Science | Cale Bigelow | 30 | 13 | 154 |
| 511 | Population Genetics | Staff | 8 | 5 | 36 |
| 512 | Professional Turfgrass Systems | Zac Reicher | 13 | 33 | 148 |
| 515 | Plant Mineral Nutrition | Sylvie Brouder | 0 | 0 | 32 |
| 520 | Principles and Methods of Plant Breeding | Gebisa Ejeta | 10 | 4 | 39 |
| 525 | Crop Physiol. And Ecol. | Jeff Volenec | 50 | 40 | 285 |
| 535 | Boundary Layer Meterology | Rich Grant | 1 | 0 | 4 |
| 540 | Soil Chemistry | Cliff Johnston | 5 | 15 | 51 |
| 544 | Environ. Organic Chem. | Linda Lee | 28 | 15 | 120 |
| 545 | Remote Sens. of Land Resourc. | Melba Crawford | 15 | 18 | 129 |
| 548 | Remote Sensing Seminar | Melba Crawford | 2 | 5 | 57 |
| 549 | Earth Observation Seminar | Melba Crawford | | | new |
| 552 | Adv. Stat for Exp. Res. | Staff | 0 | 0 | 0 |
| 553 | Intro SAS Programming | Judy Santini | | | new |
| 555 | Soil and Plant Analysis | Paul Schwab | 4 | 5 | 38 |
| 560 | Soil Physics | Eileen Kladviko | 12 | 11 | 69 |
| 565 | Soil Classification and Survey | Darrell Schulze/ Phillip Owens | 13 | 7 | 90 |
| 570 | Agry in International Development | Staff | 0 | 0 | 0 |
| 572 | Molecular Cytogenetics | Scott Jackson | 0 | 0 | 24 |
| 573 | Molec. Cytogenetics Lab | Scott Jackson | 0 | 0 | 8 |
| 575 | Soil & Nutrient Mgmt | Staff | 0 | 0 | 0 |
| 580 | Soil Microbiology | Ron Turco | 0 | 9 | 31 |
| 581 | Soil Microbiology Lab | Ron Turco | 0 | 0 | 0 |
| 582 | Environ. Fate of Pest. | Ron Turco | 0 | 0 | 10 |
| 585 | Soils and Land Use | Gary Steinhardt | 0 | 13 | 101 |
| 596 | Professional Presentations | Staff | na | 9 | 44 |
| 597 | Communicating with Public | Keith Johnson | na | 11 | 16 |

Table 3.7. continued

| Course # | Course Name | Instructor | School Year | | Total |
|----------|-------------------------------|-------------|-------------|---------|-------|
| | | | 2001-02 | 2007-08 | |
| 598 | SPECIAL PROBLEMS | Staff | 25 | 29 | 188 |
| | Temporary Courses: | | | | |
| 598A | Env. Stress in Turfgrass | Yiwei Jiang | 0 | 1 | 9 |
| 598A | Phytoremediation - Soils | | 0 | 0 | 4 |
| 598B | Plant Ecophysiology | Yiwei Jiang | na | 8 | 8 |
| 598D | Soil Chem. – Heavy Metals | Paul Schwab | 7 | 0 | 20 |
| 598E | Molec. Biol. & Genomics | | na | 1 sem. | 10 |
| 598M | Genetics Math Intro | | na | 1 sem. | 18 |
| 598T | Terrestrial Bio-Geochemistry. | | na | 1 sem. | 3 |

Figure 3.1. Percentages of majors enrolled in each of the options in Agronomy, 2008

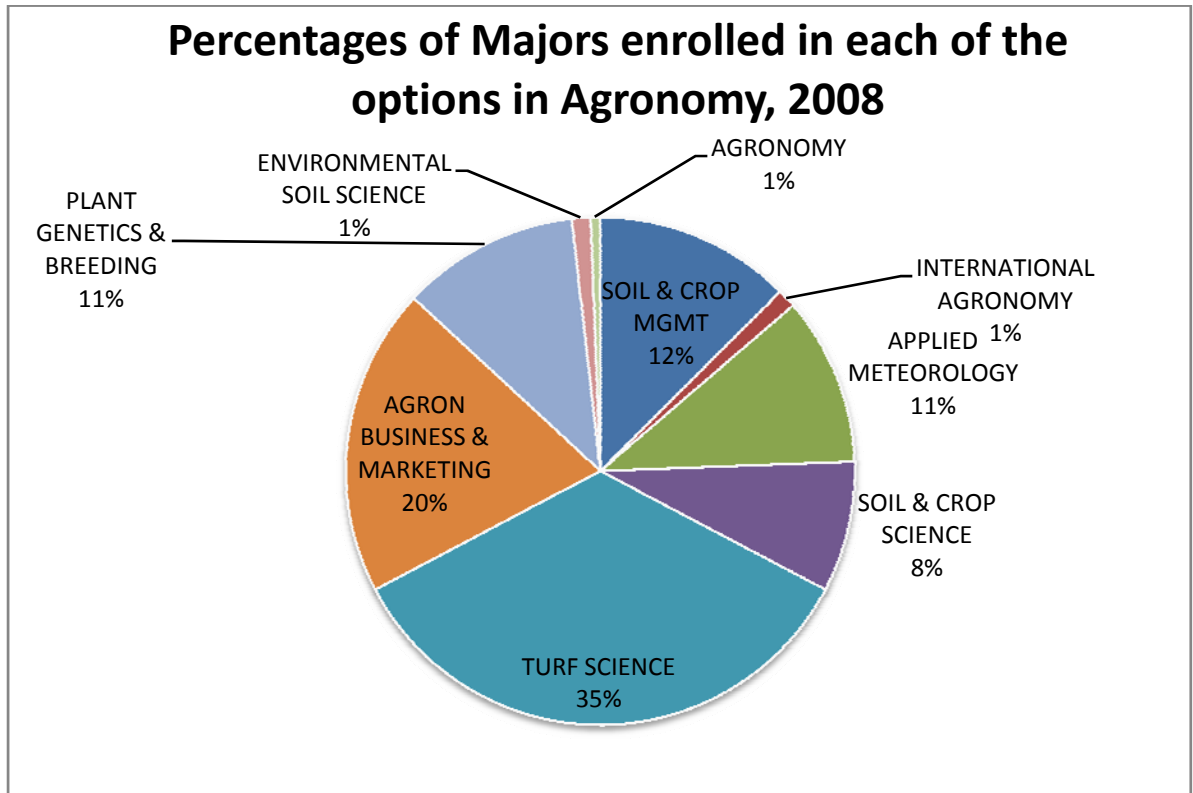


Figure 3.2. Number of students majoring in Agronomy, 2001 – 2009

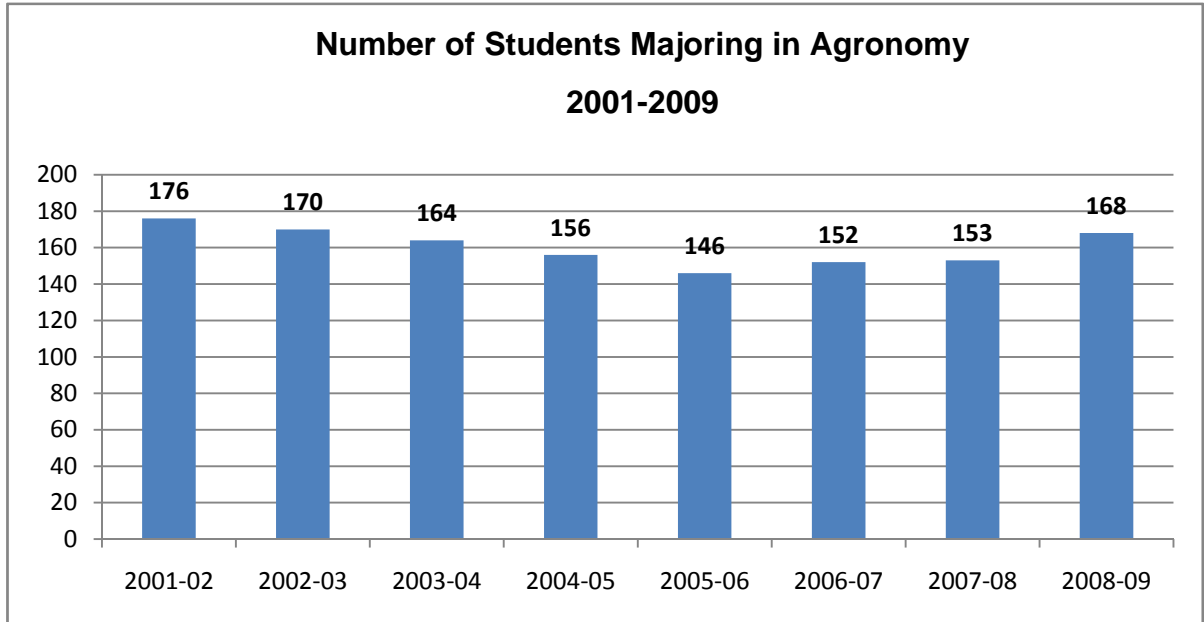


Figure 3.3. Student placement by area of employment in 2007-2008

