Undergraduate Education
Department of Agronomy
Purdue University

CSREES Review
February 2 – 6, 2009

Academic Mission:
provide to students the foundation, motivation, and continued support for a lifetime of learning and to stimulate their interest in serving society

Where we are now: Overview of the Program
- 168 students in nine options (majors)
  - Declined 5% since last review
- 79% male, 82% from Indiana, and 8% minority / international
- 10.8 faculty teaching FTE’s
- 4.5 graduate TA FTE’s
- SAT scores average 1105 compared to the College at 1079; University at 1145
- 98% of alumni have indicated satisfaction with their undergraduate experience (2003)

Enrollments at Purdue and Other Universities

<table>
<thead>
<tr>
<th>University</th>
<th>Enrollment</th>
<th>Trend (3 yr.)</th>
<th>Teach-FTE’s</th>
</tr>
</thead>
<tbody>
<tr>
<td>UIUC - crops</td>
<td>93</td>
<td>Steady</td>
<td>7.6</td>
</tr>
<tr>
<td>UIUC - nres</td>
<td>12</td>
<td>Steady</td>
<td>2.0</td>
</tr>
<tr>
<td>Iowa State - agry</td>
<td>149</td>
<td>Increase</td>
<td>11.3</td>
</tr>
<tr>
<td>MSU - crops/soils</td>
<td>89</td>
<td>Decrease</td>
<td>8.9</td>
</tr>
<tr>
<td>MN – agry/pt sci.</td>
<td>58</td>
<td>Increase</td>
<td>4.7</td>
</tr>
<tr>
<td>MN - soils/env.</td>
<td>260</td>
<td>Steady</td>
<td>5.6</td>
</tr>
<tr>
<td>OSU - hort./crop</td>
<td>220</td>
<td>Steady</td>
<td>7.9</td>
</tr>
<tr>
<td>OSU - soils/env.</td>
<td>340</td>
<td>Steady</td>
<td>13.5</td>
</tr>
<tr>
<td>Nebraska - agry</td>
<td>175</td>
<td>Decrease</td>
<td>10.9</td>
</tr>
<tr>
<td>PSU- env./soils/turf</td>
<td>187</td>
<td>Increase</td>
<td>11.8</td>
</tr>
<tr>
<td>Purdue - agry</td>
<td>168</td>
<td>Increase</td>
<td>10.5</td>
</tr>
<tr>
<td>Wisconsin - soils</td>
<td>16</td>
<td>Decrease</td>
<td>5.4</td>
</tr>
</tbody>
</table>

Student Distribution by Major

Highest enrollment was in 2000: 199 students (Enrollment in 1993 was 112)
**Placement**

<table>
<thead>
<tr>
<th>Industry/Field</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Golf/Turf Management</td>
<td>27%</td>
</tr>
<tr>
<td>Soil Conservation</td>
<td>2%</td>
</tr>
<tr>
<td>Equipment Manufacturing Co.</td>
<td>7%</td>
</tr>
<tr>
<td>Weather Service</td>
<td>1%</td>
</tr>
<tr>
<td>Teaching</td>
<td>2%</td>
</tr>
<tr>
<td>Farming/Self-Employed</td>
<td>9%</td>
</tr>
<tr>
<td>Graduate School</td>
<td>17%</td>
</tr>
<tr>
<td>Chex/Seed Industry, Farm Management/Agro</td>
<td>32%</td>
</tr>
<tr>
<td>Other</td>
<td>2%</td>
</tr>
</tbody>
</table>

44 Graduates in 2007-2008

95% placement at graduation

**Salaries 2008**

$30,000 - $65,000

Median: $42,000

**Courses and Advising**

- Courses at the 100 – 500 level = 64:
  - 100 level = 4
  - 200 level = 9
  - 300 level = 17
  - 400 level = 5
  - 500 level = 29

- 47% of courses require laboratory or field experiences

- 17 faculty advise 168 Agronomy majors

**Comments from the Last Review**

- Reviewers complimented the department on:
  - Strong undergraduate program
  - Diversity of academic offerings (options/majors)
  - Positive interaction of faculty and staff with students
  - Good integration of UG students into department
  - Mentoring programs for teaching assistants
  - K – 12 Outreach Programs
  - International components in the curriculum

- All of these areas have been maintained or strengthened - examples to follow......

**Actions Taken to Strengthen These Areas**

- Hired two faculty with primary teaching appoint. – Bigelow (Turf) / Snyder (Crops)
- Hired 14 new faculty that have strengthened curricula in the areas of turf science, hydrology, soil fertility, crop science, land resources, meteorology and climatology, pedology, remote sensing, international programs, plant physiology, and genetics
- New faculty have shown a strong commitment to undergrad education as evidenced by new courses, quality instruction, and advising

**Actions Taken to Strengthen These Areas**

- Mentoring of graduate student teaching
  - More graduate students serving as TAs
  - 17 TAs earned the Graduate Teaching Certificate
  - 5 TAs earned Advanced Graduate Teaching Certificate
  - 3 TAs awarded the Grad School Outstanding Teaching Award
  - 3 TAs inducted into the Purdue Teaching Academy
- K-12 Outreach expanded by workshops and website:
  > 7,000 teachers and students impacted
- Six new study abroad courses offered in Agronomy

**Recommendations from Reviewers**

1. Conduct comprehensive review of each option with alumni and employer input
2. Encourage greater faculty involvement in advising and curriculum development
3. Increase use of instructional technologies to include developing Internet and distance learning opportunities
4. Expand leadership, research, and internship opportunities for students
1&2. Curricular Review / Faculty Input

- Established a Department Curriculum Committee
- Conducted a survey of alumni
- Solicit annual input from the Agronomy Advisory Council and graduating seniors
- Reviewed all options with input from all faculty
- Major changes in Plant Breeding and Genetics and Turf Science options
- Capstone courses established in Department / College
- College and Department developed learning outcomes for academic programs – assessment processes still being studied

3. Instructional Technologies

- First Agronomy distance ed course developed: Turf Management (Agry 210Y)
- Soils Resource Center instructional units reworked for computer directed learning
- Student response devices (CPS) used in a number of courses and workshops
- Adobe Connect and Adobe Presenter used for Internet delivery of learning modules and for On-line tutoring
- Blackboard-Vista is portal for most courses

Environmental Science Curricula

- Purdue conducted extensive review of environmental research and academic programs: good depth and breadth; however, students confused about access
- New Pre-Environmental Studies Program
  - Serves as a portal for students interested in environmental issues
  - Orientation course gives students an understanding of campus-wide programs
- NRES revised (interdisciplinary CoA program)
- Faculty leadership from Agronomy / 68 students

Soils Resource Center

- An Interactive Environment
  - One topic each week
  - Computer Directed Using Adobe Presenter
  - Three hours per unit

Students Responding to Question

Adobe Connect used to Originate or Receive Remote Lectures

Presentations from within the U.S. and from foreign countries
On-line Tutoring

Calculation of meq/L, Ca & Mg

\[
\begin{align*}
\text{Ca} & = 1386 \text{ mg/L} \\
& = 1 \text{ meq Ca/L} = 40 \text{ mg/L} \cdot 2 = 20 \text{ mg/L} \\
& = 1386 \text{ mg/L} = 20 \text{ mg/L} = 0.0693 \text{ meq/L} \\
\text{Mg} & = 16.1 \text{ mg/L} \\
& = 1 \text{ meq Mg/L} = 16.1 \text{ mg/L} \cdot 2 = 12.2 \text{ mg/L} \\
& = 16.1 \text{ mg/L} = 12.2 \text{ mg/L} = 0.122 \text{ meq/L} \\
\end{align*}
\]

\[
\text{Ca} = \frac{(1386 \text{ mg/L}) \cdot 20}{0.2} = \frac{27720}{0.2} = 138600 \\
\mu_L = \frac{138600}{12.2} = 1138.8 \text{ meq/L}
\]

Rugged Tablet PC's

Access layered maps in an instant and follow your route over the landscape by GPS

iFarm – Farm Simulation – Decision Making Tool

Focus: Developing Tomorrow's Leaders

Developmental Areas:
1. Technical Expertise and Applications
2. Communication and Interpersonal Skills
3. Appreciation of the Humanities / Arts
4. Leadership and Teamwork Skills
5. Ethical Practices
6. Business / Management Skills
7. International and Cultural Understanding
8. Personal and Social Responsibility
9. Desire for Continued Learning

4. Leadership, Research, Internship Opportunities for Students

- College Leadership Certificate
- Four Clubs – Agronomy Club, Turf Club, Soil and Water Conservation Club, Environmental Science Club
- Leadership positions held and honors received by our students at the national level
- Agronomy Ambassadors
- CoA Dean's Scholars Program / Honors – Special problems courses increased from 11 to 25 annually
- CSSA Golden Opportunities Program – 3 students from Purdue
- 100% of students conduct professional experiences

1. Technical Expertise and Applications: (approx. 70% of credits)

<table>
<thead>
<tr>
<th>Subject</th>
<th># of students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agronomic Business and Marketing</td>
<td>33</td>
</tr>
<tr>
<td>Plant Genetics and Plant Breeding</td>
<td>19</td>
</tr>
<tr>
<td>Soil and Crop Science</td>
<td>14</td>
</tr>
<tr>
<td>Soil and Crop Management</td>
<td>21</td>
</tr>
<tr>
<td>Turf Science</td>
<td>58</td>
</tr>
<tr>
<td>Applied Meteorology</td>
<td>18</td>
</tr>
<tr>
<td>Environmental Soil Science</td>
<td>2</td>
</tr>
<tr>
<td>International Agronomy</td>
<td>2</td>
</tr>
<tr>
<td>Associate Degree</td>
<td>1</td>
</tr>
</tbody>
</table>

TOTAL = 168
Opportunities to Combine Classroom, Laboratory, and Field Experiences
(Approx. 50% of courses are lab or field based)

Excellent Soils and Crops Resource Centers
• Provide one-on-one instruction
• Individual tutoring

Excellent laboratories, specimens, and displays

Excellent field facilities near campus
Agronomy Center for Research and Education
W. H. Daniel Turfgrass Research and Diagnostic Center

2. Communication and Interpersonal Skills
• Engl 106 / 420 – Composition and Business Writing / plus 3-credit elective
• Com 114 – Public Speaking
• Video tape students interviewed by professional Human Resource persons (Agry 498)
• Team projects, case studies, and discussions - used in many Agronomy courses
• Example of discussions in Introductory Soil Science - required of all majors

Discussion Sessions each Friday: A time for reflection and interactive learning
Review of the week
Three tables each with 4-5 students
Three-Phase Discussion Sessions

- Reflecting and Writing
- Discussing and Sharing
- Teaching and Learning

3. Appreciation of Social Sciences / Humanities / Arts

- 21 credits
- 18% of graduation credits
- Selected readings related to history / agriculture
- 9 credits of these are international understanding

4. Leadership and Teamwork Skills

- College of Agriculture Leadership Certificate
- Four student clubs in Department (and 800 more across campus)
  - Agronomy Club
  - Soil and Water Conservation Club
  - Turf Club
  - Environmental Science Club
- Agronomy Ambassadors Program
- Internship opportunities
- Departmental work opportunities
- Honors Program

Agronomy and Conservation Club

Agronomy Club members, regularly attend national Agronomy meetings

Soil and Water Conservation Club enjoying a volleyball match following a guest speaker

Last year’s national President was from Purdue

Environmental Science Club

- Interdepartmental Student Organization
- guest speakers, field trips, and community service projects...

Turf Science Club and Contests

Turf Club

Turf Contest

In 2007, five teams ranked 2, 3, 4, 17, and 21 out of 81 teams nationally at Turf Bowl Competitions
Soils and Crops Judging Teams

Since 2004 Team has placed 1st in Regionals
2nd at NACTA nationals:

Highly Competitive in Kansas City (4th) and in Chicago (3rd)

Agronomy Ambassadors

• Learn about all areas of Agronomy
  – Meet faculty, other students
• Develop interpersonal skills
• Gain leadership skills
• Provide information and public relations to visitors – students, parents, scientists, advisory council

Honors Research

• Hands-on research experience
  – Formulate objectives
  – Apply scientific principles
• All areas in Agronomy & related disciplines
• Co-authorship
  – Oral presentations: regional/national meetings
  – Journal publications

5. Ethical Practices

• Freshman and Senior Seminars have programs on ethics in the workplace
• Undergraduate research involves mentors discussing with students ethical scientific practices
• Each course syllabus stresses honesty and maintaining integrity with other students
• Each faculty member treats students with respect and fairness – role model
• Club advisors and coaches stress honesty and commitment to positive interactions with others

6. Business and Management Skills

• 18 – 28 credits in Economics / Ag Economics / Management
  (14 – 22% of graduation credits)
• Internship Experiences
  – Seed companies
  – Ag chemical companies
  – Government positions
  – Golf courses / athletic fields
  – Consulting companies, etc.
• Agronomy Club Sales

Agronomy Club Sales

Plant Mounts
Soil Texture Samples
pH Test Kits
Munsell Color Charts
Purdue Agronomy Clothing
Demo Materials for Teachers

Agronomy Work Session

Approximately $2,000 in sales annually

Harvesting Pumpkins for Sale at Purdue
7. International and Cultural Understanding

- CoA – Multicultural Awareness (3 credits)
- Numerous courses including Agry 285 (Crop Adaptation and Distribution) Agry 460 (Contemporary Issues in Agriculture) and Agry 350 (Global Awareness)
- International minor in the College or an International Agronomy major in the Department
- Study Abroad Opportunities offered by Agronomy Faculty (8 new courses)

International Experiences

Organic Ag: England – Wales – Netherlands – France - Italy

8. Personal and Social Responsibility

- Student volunteer activities
- K – 12 workshops
- Service learning courses
  – e.g. Agry 565 / 498

Examples of Service Learning Projects

- Land use recommendations for Historic Prophetstown
- Assessment of land for West Lafayette Soccer Field
- Land resource visuals Celery Bog – WL Parks
- Support to Ag Educators: Crops and Soil Judging

Sustainable Agriculture

Costa Rica, Guatemala & Honduras

Study Animal and Crop Agriculture

Hungary and Romania, '04 & '09
**Student Service**

- Stabilizing Eroded Trails in Happy Hollow Park
- Planting Trees at Wildcat Creek Restoration Project

**Public Service and K-12 Outreach**

- Using “Soil Colors” to Paint Pictures at Purdue’s Spring Feast

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**9. Desire for Continued Learning**

- Providing a foundation of knowledge that fosters increased learning
- Motivating students through faculty excitement for the subject matter and quality instruction
- Encouraging students to approach learning in multiple ways
- Providing continued support for learning through web-based resources

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**Where we want to go:**

- Continue the new initiatives since 2002 and
  1. Maintain a sense of shared mission to the scholarship and value of teaching in the department
  2. Provide strong, forward-looking and innovative undergraduate education programs that attract a diverse, high-quality student body
  3. Develop educational programs that reach beyond the campus to K-12 and distance ed students

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**How we will get there:**

1. **Shared Teaching/Learning Mission**
   - Revisit Departmental Strategic Plan – Preeminence in Undergraduate Education
   - Maintain core group of faculty with >60% Teaching
   - Regular review of each course syllabus
   - Institutionalize a peer evaluation system of courses and instructors
   - Mentor graduate TAs – future faculty!
   - Foster scholarship of teaching and acquisition of external funding for education initiatives

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**2. Innovative educational programs that attract diverse, high quality students**

- Review curricula on rotating basis
- Conduct alumni surveys focused on 2, 5, 10, and 20 year alumni groups and the employers
- Develop assessment procedure for current and future learning outcomes
- Consider a new Soil and Hydrologic Sciences option replacing the Environmental Soil Science option
- Develop a Sustainable Food Systems minor in the College of Agriculture
- Develop ways of incorporating the departmental Grand Challenges into our courses and curricula

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**2. (continued) - Innovative educational programs that ……**

- Provide students opportunities to take certification exams (i.e. CCA, HAZWOPER)
- Enhance student diversity through strategic recruiting initiatives
- Aid in the matriculation of 2-year Ivy Tech Community College and Vincennes University students to Purdue Agriculture
- Increase scholarship support (currently $57K)
- Expand research opportunities & B.S./M.S Program
- Develop more writing, speaking, case studies, leadership, and service learning opportunities
3. Outreach to K-12 and Increased Web-based Learning Opportunities

- Formally institutionalize our K-12 outreach program and improve efficiency
- Expand use of appropriate instructional technologies in our courses – on and off campus
- Assess needs, then develop additional distance education courses – credit and non-credit - dual credit to high schools, Ivy Tech. (assist faculty with funding opportunities)
- Expand use of web-based guest lecturers

Questions and Discussion

Graduating Senior Survey - 2008

Selected Results from the Agronomy Senior Exit Interview Survey 2008

Graduating Senior Survey - 2008

<table>
<thead>
<tr>
<th>A. My academic advisor was helpful in developing my academic plan of study.</th>
<th>SA</th>
<th>A</th>
<th>U</th>
<th>D</th>
<th>SD</th>
<th>NA</th>
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</thead>
<tbody>
<tr>
<td>58</td>
<td>30</td>
<td>6</td>
<td>3</td>
<td>3</td>
<td></td>
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</table>

<table>
<thead>
<tr>
<th>B. My academic advisor was available to help when I needed assistance.</th>
<th>SA</th>
<th>A</th>
<th>U</th>
<th>D</th>
<th>SD</th>
<th>NA</th>
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<td>3</td>
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<td>3</td>
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</table>

<table>
<thead>
<tr>
<th>C. The courses in Agronomy were valuable to me.</th>
<th>SA</th>
<th>A</th>
<th>U</th>
<th>D</th>
<th>SD</th>
<th>NA</th>
</tr>
</thead>
<tbody>
<tr>
<td>55</td>
<td>42</td>
<td>3</td>
<td></td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>E. I felt the Agronomy faculty and staff wanted me to be successful.</th>
<th>SA</th>
<th>A</th>
<th>U</th>
<th>D</th>
<th>SD</th>
<th>NA</th>
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<tr>
<td>79</td>
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</table>

<table>
<thead>
<tr>
<th>F. Agronomy faculty were available for discussion and assistance outside of class.</th>
<th>SA</th>
<th>A</th>
<th>U</th>
<th>D</th>
<th>SD</th>
<th>NA</th>
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<table>
<thead>
<tr>
<th>P. I value the education I received from the Agronomy Department</th>
<th>SA</th>
<th>A</th>
<th>U</th>
<th>D</th>
<th>SD</th>
<th>NA</th>
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<td>82</td>
<td>18</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>R. My education made me better at:</th>
<th>SA</th>
<th>A</th>
<th>U</th>
<th>D</th>
<th>SD</th>
<th>NA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Understanding Concepts / Principles</td>
<td>55</td>
<td>42</td>
<td>3</td>
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<td></td>
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<td>Problem solving skills</td>
<td>36</td>
<td>48</td>
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<td>Leadership skills</td>
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<td>31</td>
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<td>Written communication skills</td>
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<td>Professional preparation</td>
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<td>Understanding other cultures</td>
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<td>Developing life-long learning skills</td>
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