Extension Education

A. Mission

The mission of the Purdue Agronomy Extension group is to develop, integrate, and extend agronomic information and technology that is timely and relevant to the agricultural and environmental concerns of our diverse clientele from Indiana, the nation, and the international community.

B. Where we are now

1. Overview of Agronomy Extension Program

a. ***Current Extension personnel:*** The Agronomy Extension group is highly regarded within the state and many programs are regionally and nationally recognized for their outstanding contributions to our diverse clientele groups. The Agronomy Extension group currently totals 13.03 FTEs, including 7.68 faculty FTEs and 5.35 administrative professional (A/P) FTEs working in the general areas of 1) agricultural meteorology and climatology, 2) crop and soil management systems, 3) turf management systems and 4) water and environmental quality. A summary of the current Agronomy Extension group is listed in Table 3.9.

b. ***Changes in Extension personnel since last review:*** Since the last review, we have added 0.08 Extension faculty FTEs if the individual that will be hired for the soybean and small grains Extension faculty position (0.65 Extension FTE) is included in these calculations. We also have lost 11.6 Extension A/P FTEs since the last review. The significant decrease in our A/P Extension staff was the loss of our entire soil and water quality education program staff, consisting of 12 A/Ps spread throughout the state. The soil and water quality education program staff was our primary outreach arm for our conservation tillage, Hoosier Riverwatch and other conservation programs. We do not anticipate regaining any of these positions.

c. ***Current Extension program highlights:*** The Agronomy Extension group works across all areas of transformation Extension programming. A partial listing of some of the higher profile programming efforts includes:

i. ***Websites:*** *KingCorn.org, http://www.agry.purdue.edu/ext/corn/; The Chat 'n Chew Café, http://www.agry.purdue.edu/ext/corn/cafe/; Turfgrass Program, http://www.agry.purdue.edu/turf/index.html; and IClimate.org, http://www.agry.purdue.edu/climate.*

ii. ***Conferences:*** Indiana CCA Conference, Kentuckiana and Michiana Crop conferences, and the Indiana Green Expo
iii. ***Field-based workshops:*** Purdue Crop Diagnostic Training and Research Center (DTC) Field Days, Midwest Regional Turf Field Day, Purdue Forage Day (see Appendix K.1 for DTC overview)
iv. ***Classroom-based workshops:*** Crop Management Workshops, DTC Winter Workshops, Indiana-Illinois Turfgrass Short Course, Basic Turf Training School and the Midwest Turf and Ornamental Seminar
v. ***High impact publications*****:** Corn and Soybean Field Guide, Corn and Soybean Growth and Development CDs, Forage Field Guide, and the Home and Environment Extension series
vi. ***Corn and soybean variety trials:*** Purdue Crop Performance Testing Program for details see Appendix K.2
vii. ***K-12 education:*** High school soil and crop judging contests
viii. ***Community involvement:*** Community collaborative rain, hail, and snow (CoCoRaHS) network consisting of trained volunteers that record precipitation data and report their observations to the IClimate.org website (see Appendix K.3 for State Climate Office overview)
ix. ***Policy changing programs:*** Manure management planner software, septic system permits database.

2. Actions taken in response to the 2002 CSREES review

a. ***Identify effective delivery models to reach all farmers in the State, especially those with the largest farms.***

The Agronomy Extension group has employed several strategies to help the largest farmers in the state improve their management. The Agronomy Extension group and the Indiana Certified Crop Advisors (CCAs) initiated the Indiana CCA Conference in 2003. This two-day conference, held each December in Indianapolis, is the premier outlet for disseminating applied research results and the latest Extension information to approximately 500 practicing professionals managing in excess of 5 million acres (average of 1000 acres managed per participant) throughout Indiana and surrounding states.

The DTC program provides hands-on identification, diagnosis and remediation strategies for soil, crop, and pest management challenges to approximately 800 practicing professionals throughout Indiana and surrounding states during the growing season each year. Participants in this program impact approximately 30 million acres of farmland across the Midwestern USA each year (average of 37,500 acres managed per participant). As a reference, Indiana has approximately

13.5 million cropland acres. The Purdue Forage Day is held annually in mid to late June at various locations throughout the state. This program attracts 150-300 participants and is the principal hands-on Extension outreach program for Indiana's largest hay/forage producers.

The Corn and Soybean Field Guide and Forage Field Guide, publications of the DTC, are comprehensive manuals for producing these crops. Distribution of these field guides continues to increase, with over 70,000 copies sold in 2008 to clientele throughout the Midwestern USA (approximately 20 states), Canada and Mexico, making these the most widely used field guides available. Corn and Soybean Growth and Development CDs also have been produced and more than 8500 copies have been sold.

Web-based information delivery also is employed extensively. KingCorn.org is recognized nationally and internationally as a leading source of corn production information, with approximately 450,000 page views each year. The Chat 'n Chew Café receives more than 120,000 page views each year, and along with the Department of Entomology's Pest and Crop Newsletter, are the principal outlets for timely production oriented information for producers, consultants and other professional agronomists from across the USA.

To provide more direct communication to our Indiana-based clientele, Agronomy Extension specialists participate in bi-weekly agriculture roundtable meetings during the growing season to facilitate current information about crop and weather conditions, pest and disease pressures, and market situations among Extension specialists and county Extension educators. The roundtable meetings use a combination of on-line PowerPoint slide shows and telephone conference calls to gather information from, and extend information to our county-based Extension multipliers.

b. ***Consider how to best position ourselves to address the needs of anticipated specialty crop producers.***

The College of Agriculture is currently in the process of adding three Extension Specialists to address the needs of specialty crop producers. Although these positions will not be housed in the Department of Agronomy, we anticipate supporting these new hires with our existing Extension staff as appropriate.

c. ***Assess the educational programs of benchmark universities to minimize unnecessary redundancy, improve efficiency, and identify new opportunities for multi-state collaboration on regional issues.***

Purdue University, the University of Kentucky, Michigan State University and The Ohio State University offer several joint Extension program offerings in agronomic crop production. These offerings include the Kentuckiana (200 participants each year) and Michiana (150 participants each year) crops conferences and the Ohio Farm Science Review where Agronomy Extension Specialists account for roughly 50 percent of the educational programming at each event. Purdue University and Michigan State University hired an irrigation Extension specialist in 2006 to address the irrigation needs of producers in northern IN and southern MI. The DTC program provides training opportunities for practicing professionals throughout the region each year and non-Purdue Extension specialists from across the region frequently participate as presenters in this program to provide additional insights to both participants and campus-based presenters. Agronomy Extension specialists also participate in the annual North-Central Soil Fertility Research and Extension Conference held in Des Moines, IA. Soil fertility recommendations are fairly well coordinated across Indiana, Michigan and Ohio. The Tri-State Fertilizer Recommendations for Corn, Soybeans, Wheat and Alfalfa Extension bulletin is used across all three states.

Our turf program also bridges state lines, providing educational opportunities for turf professionals via the Indiana-Illinois Turfgrass Short Course, the Midwest Regional Turf Field Day, the Midwest Turf and Ornamental Seminar, the Basic Turf Training School, and the Indiana Green Expo. Collectively, these turf Extension programs reach approximately 4000 people annually.

d. ***Engage County Extension Educators more fully in program planning, development and delivery.***

Charles Hibberd, the new Purdue University Cooperative Extension Director is making a concerted effort to improve the interactions among county-based staff and campus-based staff. Significant changes in the annual Extension Conference are being made that will emphasize cooperative program development. A special Extension coordination meeting for campus- and county-based staff is scheduled for March 12 2009. Agronomy Extension specialists participate with county Extension educators in the planning of the annual SW Indiana Crop Seminar (regional meeting held in Jasper) and the bi-annual SW Indiana Diagnostic Training Program (regional in-field training held at SWPAC). Campus specialists regularly deliver programs at the annual SW Indiana Corn/Soybean Day (regional meeting held in Evansville) and the Bi-State Ag Crops Clinic (regional meeting held

near Covington); both meetings are organized by regional clusters of county Extension educators.

e. ***Provide leadership for the formation of multidisciplinary, integrative teams for program development and delivery. This should include faculty from within and outside the Department of Agronomy.***

The College of Agriculture administration is committed to this approach and the Cropping Systems Initiative resulted in 6 new hires in the College of Agriculture including our new Soil Fertility Extension specialist and our former soybean and small grains Extension specialist (for whom we are currently seeking a replacement). Five Agronomy Extension specialists are integral members of the operations committee for the DTC. The DTC program is an excellent example of an integrative team that regularly provides comprehensive training across agronomy, soils, weed, disease and insect program areas.

Purdue Agronomy Extension faculty and staff also have been prominent recipients of the Purdue Agriculture Team Award for multidisciplinary research, teaching and Extension. Three times since the last CSREES review, Purdue Agronomy Extension faculty have been members of award winning teams including the Land Use Team in 2002, the Turf Science Program in 2004 and the Purdue Crop Diagnostic Training and Research Center in 2008.

f. ***Seek opportunities to establish a greater presence relative to environmental issues in rural-urban interface environments.***

We have expanded our efforts in the rural-urban interface with our Home and Environment Extension series, and we have one of the leading turf Extension programs in the country. The Midwest Regional Turf Foundation is housed in the Agronomy Department at Purdue University. Agronomy Extension staff also are members of the multi-departmental Extension Land Use Team that helps community leaders assess local needs and resources to develop proactive, long term expansion plans and address local community concerns in an inclusive atmosphere of cooperation.

g. ***Add faculty or professional Extension position in soil nutrient management.***

We hired a new Soil Fertility Extension Specialist in 2005. This person has developed cutting edge research programs in corn nitrogen management (including late season crop nitrogen status assessment

and management using crop sensor technologies) and manganese interactions with glyphosate-resistant soybean.

h. ***Address pending retirement of faculty member with expertise in soybean and small grain Extension.***

The Agronomy Department did hire a new soybean and small grain faculty Extension specialist, but this person left in 2007 for another position. We are currently interviewing to refill this position with a person who has the ability to immediately address the current production and management challenges facing our clientele and the vision to develop a forward thinking research and Extension program in soybean and small grains management that will position producers to meet new production, management and marketing opportunities.

i. ***School of Agriculture and Department of Agronomy should seek new sources of funding for applied research needed by Indiana farmers. These sources could include, but are not limited to, the following: 1) input and output check-offs, 2) endowments, 3) regional and national competitive grant programs and 4) legislative funds.***

Prior to 2007, the only source of commodity check-off support for applied research in Indiana was Indiana's share of the national soybean check-off program. Indiana instituted a corn check-off program in 2007 that we hope will be used for applied research in the near future. Soybean check-off funds have allowed several members of the Agronomy Extension group to conduct soybean production systems research related to tillage and nutrient use efficiency, and one project for corn nitrogen response research was funded via the corn check-off program this year. The College of Agriculture administration is currently developing a fertilizer check-off program proposal, but high fertilizer prices and an unstable farm economy have limited the opportunity to actively pursue and market this program. Smaller "seed grant" opportunities currently exist in the College of Agriculture, but they are generally limited to $25,000 per year or less.

j. ***Supportive of proposal for the construction of an Education and Demonstration Facility at the Diagnostic Training Center as funding becomes available.***

The Beck Agricultural Education Center was dedicated in late 2007 and is used extensively for workshops and other Extension programming efforts. This state of the art facility allows us to be able to conduct both hands-on and classroom-based educational programs

for our clientele. The Beck Center can be used for computer-based training and provides an excellent learning environment for staging distance education based programming.

k. ***The Department should consider establishing a long-term farm equipment replacement strategy at the agronomy center for research and education (ACRE) as suitable equipment is critical to applied research, which is the foundation of the Extension programs in the Department.***

The Agronomy Extension group fully supports the establishment of an equipment replacement and enhancement initiative for ACRE and also at the seven other Purdue Agricultural Centers (PACs) throughout the state. No formal plan has been developed to institute this initiative.

l. ***Extension administration should explore creative modifications in the County Extension Educator role to allow for more specialization in a technical area without losing the direct connection to the county. One possibility would be for County Extension Educators to pool expertise among a cluster of neighboring counties.***

The Agronomy Extension group fully supports such an initiative. This specific issue will likely be one of the topics that Charles Hibberd, the Purdue University Cooperative Extension Director will discuss with campus- and county-based staff at our Extension coordination meeting March 12 2009.

3. Program focus

a. ***Serve as the definitive source of nonbiased, science-based information***

Extension has long been recognized as the primary source of nonbiased, science-based information. In recent years, much of the Purdue Agronomy Extension group's information has been delivered through third party multiplier groups that may or may not properly cite the original source of this information. Although Extension personnel may be getting less direct credit for this information than in the past, the benefit is that more producers directly benefit from our information being delivered through third party vendors. Some discussions with Purdue University's Agricultural Communications Department have taken place to consider "branding" Extension information, but we do not want "branding" to negatively impact the use of our information. Improved marketing of our information, people and programs may be a more effective strategy to keep

Extension in the spotlight. We have successfully deployed our Corn and Soybean Field Guide using a marketing strategy where corporations can have their own company logo on the front and back covers while fully maintaining the integrity of the information within the guide itself.

b. ***Maintain and expand proactive and relevant applied research programs***

An active, timely applied research program that directly addresses clientele needs is the backbone of any successful Extension program. State and local funding for applied research currently is limited in Indiana because input- and output-based check-off programs are lacking compared to our peer institutions. While the corn check-off program may improve this situation for some, the Agronomy Extension group is generally forced to use creative means to fund our applied research programs. Most faculty use smaller (less than $25,000), generally non-recurring internal “seed grants” from the School of Agriculture or the Center for the Environment and couple these with $5000 - $10,000 industry grants to fund much of their applied research.

Several members of the Agronomy Extension group have not been able to adequately support their Extension initiatives, and in these programs applied research activity has decreased significantly. With the increased emphasis in outreach deliverables required in many federal agency RFPs, we hope that new sources of funding to support applied research will be forthcoming in the near future.

Even with the current funding limitations, eight faculty members of the Agronomy Extension group (faculty with at least a 0.40 Extension FTE) have been the major advisor for 38 of the 101 graduate students that have earned Agronomy M.S. and Ph.D. degrees since the last CSREES review.

C. Where we want to go

1. ***Improve the efficiency of our Extension program delivery***

Human resources in Extension have decreased within our department and college in recent years with similar, often more dramatic decreases in surrounding states. Concurrently, our potential clientele base has increased and the challenges facing these diverse clientele groups have become more complex. We must optimize our delivery efficiency and collaborate more effectively with other departments to provide a systems approach to these complex challenges.

2. ***Identify and proactively address new areas of Extension***

   Biofuel crops, air quality, manure-borne constituents (pathogens, hormones and pharmaceuticals), nutrient criteria and TMDLs, comprehensive land use planning, climate change and carbon crediting are just a few emerging issues that may need to be addressed by Extension in the coming decade. Continued expansion of technology-based agriculture, especially technologies associated with GPS and GIS applications, requires that Extension agronomist be familiar with new technologies and their application for improving the efficiency and profitability of crop production. We must prioritize new potential areas of Extension program expansion and determine whether we can address these challenges.

3. ***Foster acquisition of resources for applied research***

   Funding for applied research to support our Extension programs is woefully inadequate. We must become more proactive in identifying potential donor organizations to support our applied research programs.

4. ***Develop the next generation of Extension specialists***

   One of the greatest challenges that we and our peer institutions have encountered in recent years is finding exceptionally qualified candidates for Extension specialist positions. Few agronomy graduate programs are grooming the next generation of Extension specialists. We believe that the Purdue Agronomy Extension group has the breadth, depth, and dedication to develop the next generation of Agronomy Extension specialists.

D. How we will get there

1. ***Improve the efficiency of our Extension program delivery***

   a. One issue all Extension specialists face is developing a balance among one on one contacts, 25-60 minute single topic presentations at county- or company-based grower meetings and in-depth presentations in workshop settings. All three interaction models with our clientele have merit. In some cases our Extension staff may make the same basic presentation multiple times to various groups, and this can create a significant drain on our limited time and resources. As the technology for Web-based information transfer improves, we need to begin transitioning to a greater use of these distance education tools to reach out more efficiently to wider audiences in Indiana, the region, the U.S., and the world. These communication technologies may allow us to reduce the number of trips made to individual counties for traditional one-topic meetings.

b. Extension programming is often responsive or reactionary in nature. However, some information that we generate is either timeless or only slowly evolving. To increase our program delivery efficiency, we will likely need to develop some curriculum-based Extension programming that can be developed for, and delivered by our multiplier partners. We developed an initial draft of a soil fertility related Extension curriculum and it is now time for us to revisit and expand curricula-based Extension programming.

c. Developing a balance among the different levels of transformational Extension programming will be increasingly important. We are currently evaluating where we stand as individuals, programs and as an Extension group with respect to our current efforts and ideal balance among levels of transformational Extension programming that we have identified. Based on the results of our individual program assessment and discussion of the collective needs of our Agronomy Extension program, we will begin to reorganize and improve the balance of our individual and collective Extension programming efforts.

2. ***Identify and address new areas of Extension***

a. Identifying, prioritizing and effectively addressing new Extension opportunities and challenges is one constant in Extension. With our limited number of Extension FTEs we will need to be more effective at deciding which of many issues we can address with our existing expertise.

b. We will need to revisit our departmental strategic plan and establish a process for identifying the issues that we can effectively address as an Extension group. The more aligned our efforts can be with the Grand Challenges identified within the department, the more likely we will be able to develop research-based Extension programs.

3. ***Foster acquisition of resources for applied research***

a. Our ability to affect significant changes to increases in applied funding via our corn and soybean check-off programs is currently limited. Agricultural Administration deals directly with the oversight committees that decide what areas are most important to fund. We currently send ad hoc white papers to Agricultural Administration and these white papers are passed on to the oversight committees. As a result we do not have a collective voice or prioritized ranking for our applied research agenda.

b. We will need to revisit our departmental strategic plan and establish a process for prioritizing our collective priorities in applied research.

c. Our ability to increase funding for applied research also is somewhat limited to how quickly Agricultural Administration pursues a Fertilizer check-off. The Agronomy Extension group should draft a white paper on the importance of this potential funding source with a list of potential projects that could be supported with these funds.

4. ***Develop future Extension specialists***

a. We have a highly motivated group of individuals that are interested in developing the next generation of Extension specialists. While this has not been an explicit goal of the Agronomy Extension group in the past, unsuccessful Extension specialist searches by our own department and those of our peer institutions have caused us to place a renewed emphasis on training Ph.D. students interested in pursuing Extension positions.

b. Two ¼-time Agronomy Extension assistantships (one semester in length) were created in 2006 to begin addressing the lack of relevant Extension experience demonstrated by recent candidates that applied for Extension specialist positions. These students travel with several Extension specialists, provide reports and develop Extension publications. We plan on revisiting the expectations of these Extension assistantship awardees and possibly extending the length of each award to at least two semesters to provide more depth and breadth to their Extension experience.

c. The DTC generally provides three ½ time assistantships to students that are expected to assist with DTC plot management and general upkeep. We will investigate potential changes to these roles to get the students more directly involved in program development and delivery.

d. The principal instructor for the Communicating With The Public Seminar (AGRY 597) is a member of the Agronomy Extension group. We will evaluate the performance objectives for this class to possibly include revising or developing at least one Extension bulletin as part of the course requirements.

e. We will revisit the departmental strategic plan to develop reasonable metrics for graduate student mentoring by Extension specialists.

Table 3.9. Extension faculty and A/P staff responsibilities and budgeted extension appointments.

Agricultural Meteorology and Climatology			
Dev Niyogi	Faculty	State climatologist	0.25
Ken Scheeringa	A/P	Climatology outreach	0.45
Total FTE			**0.70**
Crop and Soil Management Systems			
Craig Beyrouty	Faculty	Department head	0.33
Sylvie Brouder	Faculty	Plant nutrition, soil fertility, ecology	0.30
Jim Camberato	Faculty	Soil fertility	0.55
Brad Joern	Faculty	Nutrient management planning	0.15
Keith Johnson	Faculty	Forage management	0.80
Eileen Kladivko	Faculty	Cover crop and drainage management	0.05
Robert Nielsen	Faculty	Corn management	0.85
Phillip Owens	Faculty	Soil mapping	0.10
Gary Steinhardt	Faculty	Soil conservation and youth education	0.40
Jeffrey Volenec	Faculty	Forage physiology and management	0.10
Tony Vyn	Faculty	Cropping systems	0.60
*Vice- Shawn Conley	Faculty	Soybean and small grains management	0.65
Faculty FTE			**4.88**
Jim Beaty	A/P	Agronomy center for research and education	0.10
Philip DeVillez	A/P	Purdue crop performance program	1.00
Corey Gerber	A/P	Purdue crop diagnostic training and research center (DTC)	1.00
Phil Hess	A/P	Nutrient management planning	0.25
Charles Mansfield	A/P	Small grain, soybean and corn management	0.30
Terry West	A/P	Cropping systems	0.10
A/P FTE			**2.75**
Total FTE			**7.63**

Table 3.9. (cont.) Extension faculty and A/P staff responsibilities and budgeted extension appointments.

Turf Management Systems			
Cale Bigelow	Faculty	Turf fertility	0.20
Zachary Reicher	Faculty	Home and professional turf management	0.60
Faculty FTE			**0.80**
Don Fassnacht	A/P	William H. Daniel Turfgrass Center	0.10
Glenn Hardebeck	A/P	Turf management	0.20
Dan Weisenberger	A/P	Turf management	0.10
A/P FTE			**0.40**
Total FTE			**1.20**
Water and Environmental Quality			
Sylvie Brouder	Faculty	Plant nutrition, soil fertility, ecology	0.30
Jim Camberato	Faculty	Soil fertility	0.10
Brad Joern	Faculty	Nutrient management planning	0.45
Eileen Kladivko	Faculty	Cover crop and drainage management	0.10
Phillip Owens	Faculty	Soil mapping	0.15
*Vice- Brad Lee	Faculty	Septic systems and land use planning	0.65
Faculty FTE			**1.75**
Brad Eisenhauer	A/P	Nutrient management planning	1.00
Phil Hess	A/P	Nutrient management planning	0.75
A/P FTE			**1.75**
Total FTE			**3.50**