



UK Department of Plant and Soil Sciences

2024 Periodic Program Review

Review Committee Site Visit April 21 – 25, 2024

Review Report Submitted on June 24, 2024

Review Committee

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Executive Summary

The UK Plant and Soil Sciences Department is strong and in an excellent position for continued and enhanced impact and growth across the three mission areas of teaching, research, and extension. The committee sees that this departmental excellence is the result of effective, transparent, and respected leadership; dedicated faculty and staff with a large breadth of focus areas; significant community and stakeholder engagement, and student academic programs that provide a balance of structured and customizable curriculum.

The committee also sees that the department has current and future opportunities and challenges associated with capital projects in the college and with the societal transition from traditional agriculture into newer research areas. The department is challenged to both recognize and represent the traditions of Kentucky agriculture while also focusing on (or transitioning to) future challenges of climate change, sustainability, technology, etc.

Brief description of review committee process

- Prior to the review, all committee members received and studied the Self-study Report submitted by faculty and staff of the Plant and Soil Sciences Department.
- The committee received their charge from Dr. Brian Lee, Associate Dean for Faculty Resources, Planning and Assessment, conducted listening sessions with departmental faculty, staff, students, and stakeholders April 22–24.
- On Wednesday, April 24, the committee held working sessions and drafted talking points about the program's strengths, challenges, opportunities, and potential committee recommendations.
- On Thursday, April 25, the committee presented draft recommendations to Martin-Gatton College of Agriculture, Food and Environment leadership.
- The Committee Chair worked with the committee to prepare this report, which all members of the committee have approved.

We begin this report with a brief list of program strengths, challenges, and opportunities that the committee observed through review of the self-study and listening sessions. This is followed by committee recommendations for the program to consider and act on over the upcoming six-year program review cycle.

Instruction

Strengths

- The committee heard consistent remarks that the chair is doing a good job to communicate, build a sense of community, and support educational programs and individuals as much as possible.
- Widely distributed network of on-campus and off-campus resources and personnel are in communication and work together.
- Undergraduates are enthusiastic about the Agricultural Ecosystem Sciences program and their experiences in it. Broad support exists among students and faculty for continuing the hands-on components of courses.
- Graduate students who have been in the department since 2016 noted considerable improvements in graduate student education, mentoring and responsiveness of the faculty to their input, and opportunities for professional development.

Challenges

Undergraduate

- For AES to move out of the stand-alone individualized curriculum to a regular bachelor's degree, there is a need for long-term planning.
- The current iteration of the AES program relies heavily on one faculty member for instruction and administration. The program should seek to broaden faculty participation.
- Extension agents and undergraduates expressed concern about what they perceived as a movement away from the messaging affiliated with the term agronomy. The program will need to investigate options that exist in the design and content of university, college, and departmental web sites to clarify that AES extends out of and broadens agronomy.
- Course requirements for NRCS jobs should better match undergraduate course offerings and specialization requirements.
- Undergraduates indicated that faculty advisors familiar with their programs are much better able to provide advising than the professional advisors outside of the department.
- The undergraduate bulletin and degree audits need to better reflect availability of courses.
- Pairing undergraduate students in their first year with upper-level undergraduates could help with advising.
- Because federal financial aid is not distributed in the summer, undergraduate students find the tuition costs of the summer field camp challenging. How can this valuable course experience be maintained but diminish its financial burdens and the work required by faculty to make this course happen?

Graduate

- The loss of motor pool access constrains the ability for some courses and instructors to take students in the field.
- More networking and professional development opportunities are needed for graduate students interested in working in industry.
- Better timing and coordination of coursework on UK campus in Lexington is needed for graduate student fieldwork in Princeton.

- Improvement of course offering times on the UK Campus so that graduate students can coordinate field work.

Opportunities

- Development of a teaching facility at North Farm and possible revitalization of infrastructure (such as Foundation Seed) for educational and research needs.

Undergraduate

- Potential for a lecturer or a faculty line in applied agronomy with a higher teaching DOE to cover gaps in AES curriculum.
- Leverage opportunities to make AES an option on the Academic Common Market.
- Extension offices are a potential gateway to recruit undergraduates and introduce them to PSS.

Graduate

- The IPSS steering committee brings together different specializations and practices. There is an opportunity for greater involvement of faculty in specifying coursework for their areas of specializations and cleaning up course listings in the Graduate Bulletin.
- Hybrid courses with other regional colleges and coordination of instruction with other land-grant universities are suggested as ways to broaden the curriculum and create more predictability in whether these courses will meet enrollment thresholds.

Research

Strengths

- The department's research breadth and depth are impressive, conducting research in disciplinary areas that include traditional areas and emerging opportunities, along with collaborative research integrating crop science research with animal and environmental science.
- Successful grantsmanship from faculty research funds and supports a strong graduate program with professional career training opportunities for students.
- Molecular to landscape scale research provides breadth and depth to do disciplinary and interdisciplinary research, along with opportunities to do multi-institutional federally funded research.

Challenges

- Lack of departmental resources and functional space supporting research: Current resources, support services, and space are limiting the research enterprise.
 - a . The current administrative load on research faculty contributing to undergraduate programs needs to be reassessed. The faculty administrative responsibilities among AES, AMBT, and NRES are overly concentrated in a few people.
 - b . The North Farm facilities are currently understaffed, and the equipment requires mechanical support and renewal to support the research farm.

- c. The departmental faculty need more support in collaborating on interdisciplinary research and multi-institutional projects.
 - d. The current access to climate-controlled growth chambers is limited.
 - e. The department is facing challenges in bringing visiting scholars to campus for research.
- Declining research FTE's associated with administration roles is compromising research productivity.
 - a. Declining research FTE's due to loss of positions and faculty moving to administrative roles is limiting the research enterprise. The Department should petition the college for research FTE's to bolster research capacity in the department.
- Faculty positions are needed that fulfill general disciplinary content areas and engage with emerging research frontiers.
 - a. Filling vacant faculty positions is challenging to meet research needs in the department.
 - b. Lack of faculty salary savings in the department limits departmental support of research projects and personnel (i.e., graduate students).
 - c. There is a need for a plant biochemist position in the department, especially to support weed science.
 - d. Need future positions (i.e., plant biochemist) to be 10 and 20 years forward looking.
 - e. There is a need for faculty work on emerging frontiers including climate change in agriculture, AI and data science, carbon sequestration and marketing, etc.

Opportunities

- Department faculty are collaborative, collegial, and productive, but to grow grant dollars in the department, additional effort is suggested in interdisciplinary research and multi-institutional projects to enrich the grant portfolio and enhance the department's reputation and brand.
- The department should assess the administrative load distribution on research faculty contributing to undergraduate programs.
- Support of the North Farm facilities is critically important to support faculty field research programs. The department should consider an assessment of staffing needs at the farm, including salaries, to ensure research success and retention of staff positions. Additional resources from the college may be necessary to address salary issues.
- Procure additional greenhouse space and growth chambers to support the research enterprise.
- A department faculty hiring plan is needed that is forward looking to address current and future research priorities.
- Declining department resources to support graduate students and repair/replacement of equipment will need to be offset with other operating funds (from the college), grant funding, or philanthropic efforts to sustain research excellence.

Extension

Strengths

- Strong connections with industry, especially for traditional agriculture.
- Department has internal extension leadership and a process for sharing information both up and down the chain.
- Active and engaged faculty both on and off-campus.
- Publications (especially forages) and other extension materials are viewed as current, relevant, and important.
- Financial support provided for extension travel.
- Specialists are available for in-person programming statewide.
- Energetic people, both experienced and new specialists.
- Extension Specialist responses are timely.
- Traditional stakeholders voiced strong support for programs overall and some individual programs specifically.
- Excellent extension program offerings, particularly at Princeton.
- Solid attendance at stakeholder committee session by traditional agronomy/crops stakeholders.
- Relatively large group of turfgrass stakeholders present for committee discussion.

Challenges

- Loss of college motor-pool is a challenge for extension personnel and programming.
- Ability to maintain statewide service in a large number of areas (topics).
- Potential demand for UG/Grad teaching by extension faculty/staff and possible negative impact of teaching contributions on extension programs.
- Administrative appointments of extension faculty pull time from extension activities.
- Retirement of forage specialist could have implications for online graduate program leadership.
- Retirement of high demand weed specialist.

Opportunities

- Extension faculty could provide valuable teaching contributions if duties can be managed, DOE equitable, etc.
- Can current teaching faculty contribute to new extension programming efforts? What new extension roles/programs are a good fit, if any?
- Strong external support and linkages with traditional industries can be leveraged to continue existing support, encourage information sharing, and increase collaboration partnerships.
- Expanded marketing of programming could help attendance and increase industry awareness/engagement.
- Increased social media presence could improve program attendance.
- Use extension channels to promote relevant research and researchers.
- Implementation and utilization of a CRM may help more easily reach targeted audiences.
- Continuance of turfgrass extension program funding and consideration of additional opportunities in turf research.

- Utilize extension agents to help with student recruitment, awareness of current research projects by faculty to stakeholders, and potential guest lecturers.

Facilities

Strengths

- Land use committee seems to function well in determining space allotments on North Farm.
- New building, greenhouses, etc., will bring dramatically improved lab and other space.
- Chair communicates information regarding facility changes and updates very well with faculty and staff. The department chair makes efforts to keep them informed via email at biannual staff meetings, as well as faculty meetings and retreats.
- Faculty and staff have collegial relationships, work well with each other, and the general consensus is that everyone has an equal voice/trust with each other. They make do with what they have, given the circumstances, and help each other out when needed.

Challenges

- The lack of a true storm shelter available at North Farm after hours is concerning. Given the tornado disaster of 2021 at Princeton, an adequate storm shelter available during normal working hours and during non-business hours is needed.
- There is a lack of medium-term property and facility plans for North Farm.
- The North Farm lacks assistance from facilities/farm crew for fixing fences, etc - the available capacity is inadequate.
- There is an issue with the decreasing number of staff with expertise in mechanics.
- A lack of communication as to changes or rumors regarding North Farm, i.e., land swap and South Farm, leads to major issues with uncertainty and fear.
- Low pay has decreased the ability to get skilled labor at the farm. CDL drivers are difficult to hire because they can get more money working elsewhere.
- Enterprise does not always have the vehicles needed by farm crew to accomplish the tasks needed. Campus crew can't necessarily do what they need without vehicular support, including finding proper places to park. Increases in time to find parking and a secure place to leave state vehicles potentially decreases research integrity.
- No feasible plan for state vehicles when construction starts and new buildings go up.
- If campus based researchers move their greenhouses to North Farm, the lack of state vehicle parking on campus will lead to inefficient use of time in getting to the farm just to water plants.
- The lack of farm crew and service crew members inhibits researchers when equipment breaks down and needs a quick repair. Waiting weeks for a repair could directly impact a researcher's efforts to continue with their projects during the growing season.
- Network for campus buildings is out of date and often does not work at all.
- Faculty and staff feel like their input for the new buildings has not been sought.

Opportunities

- There is available space on the North Farm that could be potentially utilized for departmental use once the greenhouses and seedhouses are demolished. Foundation Seed has potential to be renovated for the seedhouse/variety testing facilities. The vacant turf grass facility could also be transitioned for departmental use.
- The North Farm would really benefit from a dedicated space for meetings and a teaching pavilion. There is a potential location for a pavilion that could also double as a storm shelter.
- Short, medium, long-term planning for the facility would alleviate some concern over the future of the property and allow inclusion of displaced units/functions to be well-considered.
- Seed/greenhouse space not replicated on campus.
- More of a staff voice in facility utilization planning could improve staff engagement and morale.
- Plant Science Building could benefit from cosmetic attention to increase the curb appeal to visitors.

Administration

Strengths

- Department is collaborative with strong leadership.
- Chair's Advisory Committee includes representation across focus areas of the department (including good representation from Princeton), meets monthly, and provides a sounding board for ideas, comments, and decision making for the unit.
- The department has fall and spring faculty meetings as well as a summer retreat. Faculty report value in these meetings.
- The department has fall and spring staff meetings - the location is rotated between campus and North Farm. Open and collegial environment. Department Chair is transparent and engages with staff in discussions.
- As needed, departmental announcements are shared regularly through departmental listservs. Multiple listservs are utilized.
- Quarterly departmental newsletter keeps faculty, staff, and students informed and provides an opportunity to share accomplishments of the unit.
- Campus and farm staff share that the unit is collegial and "a good place to work." Staff feel there is trust across positions. Staff appreciate strong communication and involvement from the Department Chair.
- Department has a structured process in place to determine new faculty needs. Faculty report being included in those decisions, which are ranked at the annual retreat. Faculty hiring processes include Extension agents.
- The six most recent regular title series faculty searches have included positions with a DOE that includes 25% Instruction, 70% Research, and 5% Service. Instructional assignments include the IPSS graduate program as well as contributions to AES, NRES, and/or AMBT.
- Structured mentoring programs are available and encouraged for both staff and faculty.
- There are opportunities for staff professional development.

Challenges

- Chair's Advisory Committee includes representation across discipline focus areas but lacks diversity as represented by new faculty hires.
- Staff retention is a challenge for a variety of reasons, including compensation. Staff are leaving positions in the department given many of the salaries are not competitive. This includes significant turnover in the department business and front office staff.
- Staff share a desire to be included more in departmental communications and decision-making processes.
- There are uncertainties about space, notably about farm and greenhouse spaces. Staff shared concerns about the future of their positions due to actual or rumored potential land swaps and location changes.
- Faculty and staff are working at locations throughout the state (Lexington campus, North Farm/Spindletop, and UKREC at Princeton), and this can make communication challenging. Some individuals reported a desire to be included more in decision making processes.

Opportunities

- Continue to explore opportunities to support communication and transparency across the Department.
- With many changes to facilities and infrastructure in the near future, provide regular updates on those changes, as well as opportunities for feedback. Invite appropriate representatives from college leadership to address faculty and staff facilities questions and concerns at departmental meetings.
- Explore opportunities to diversify the Advisory Committee, including the possibility for staff and Assistant Professor representation.

COMMITTEE RECOMMENDATIONS:

- 1. Align departmental mission and vision for hiring with administrative strategic priorities.**
 - a. Evaluate departmental needs, engaging stakeholders in this process.
 - b. Retain positions and support (e.g., travel) to sustain the well-recognized Extension programming. Ensure strong communications between Extension faculty, specialists, and agents.
 - c. Prioritize recurring funding for turfgrass Extension. Explore potential partnerships with other institutions conducting turf research.
 - d. Engage other departments and college leadership to ensure equitable distribution of administrative appointments of faculty (interdisciplinary degree program administration and overall administrative duties) to ensure such commitments are sustainable without impacting overall research, teaching, and Extension capacity in Plant and Soil Sciences.
- 2. Assess long-term sustainability of the undergraduate degree program in Agricultural Ecosystem Sciences (AES) as an independent degree program.**

- a. Conduct a needs assessment, including potential students, employers, Extension agents, and other partners. Given breadth of course offerings, determine anticipated enrollment numbers.
 - b. Strategically address the long-term sustainability for the program in terms of faculty and staff instruction and administration of the program. Grow and diversify steering committee, including new faculty hires in the department, and develop leadership transition plan.
 - c. Work with Center for Student Success and Agricultural Communications to develop a marketing plan and clarification for the AES degree program to make it more clear to students for recruitment purposes and to industry for hiring purposes.
 - d. Investigate opportunities around the common market states.
 - e. Explore opportunities to increase diversity of student population - MANRRS, JUNTOS (UK Strategic Plan SF1, SF4)
- 3. Continue to evaluate the graduate program in Integrated Plant and Soil Sciences (IPSS) and develop a long-term strategy for sustaining the program.**
- a. Engage faculty in a curriculum review of the IPSS program. Consider increasing the credit hours of core coursework.
 - b. Continue to evaluate if there is a need for online instruction in the graduate program and, if so, resources to support.
 - c. Consider administrative needs for the graduate program and the potential for additional staff and/or faculty support (e.g. Vice DGS). This can be facilitated by writing up the roles and responsibilities of the Steering Committee and the DGS. Strategize a succession plan supporting leadership of the program.
 - d. Explore professional development opportunities to support industry/commercial for-profit workforce readiness of graduate students (i.e., industry).
- 4. Pursue additional effort in interdisciplinary research and multi-institutional projects that will expand the grant portfolio, align with college priorities, and enhance the department's reputation and brand.**
- a. Explore research collaborations with centers, institutes, and collaborators that align with university research priority areas (e.g., Climate Hub).
 - b. Given the approximate 21% reduction in research FTE since the last periodic review, the department should retain current faculty vacancies and fill faculty lines moving forward.
- 5. Engage with the college Office of Philanthropy and Alumni to support departmental priorities.**
- a. Prioritize departmental development targets and goals, including opportunities for student experiential learning and scholarships.
 - b. Develop philanthropy strategies with turfgrass stakeholders to determine funding opportunities (e.g., Research Title faculty position).
 - c. Explore partnership opportunities with the Office of Philanthropy and Alumni to identify new donors and secure gift funds.

- d. Consider marketing and communications plan to expand alumni engagement.
- 6. Develop a departmental farms and facilities master plan.**
- a. Provide for staff representation on facility planning committees and/or in advisory roles. Staff advisory committee could serve in this role.
 - b. Develop a long-term utilization plan for departmental areas, including the North Farm.
 - i. Renovation and modifications of the old Foundation Seed facility.
 - ii. Sites for greenhouse/headhouse/growth chambers in light of smaller facilities in new campus construction.
 - iii. Outdoor pavilion for experiential learning opportunities, alumni and stakeholder relations, Extension programming, meeting space, and more.
 - iv. Work with college and or university facilities to address safety concerns related to severe weather. Ensure adequate size and afterhours access.
 - c. Continue to work with University Parking and Transportation Services to ensure adequate and safe transportation for students, staff, and faculty between campus and North Farm.

Opportunities for college and university leadership consideration outside the purview of a single academic program or department.

1. Continue to involve faculty and staff in conversations and opportunities related to UK Collaborative Grant Services - a universal service to support faculty research so “faculty can focus on the research.” The vision and guiding principles are promising, but the department is experiencing great difficulty with this new service. The department should continue to voice concerns to the university in an effort to improve grant services provided by the university. If the department grows in grants, the UKCGS must be fully supportive of faculty for optimal grant management and research excellence.
2. Based on recent changes to allocation of open faculty lines, ensure each department has adequate operating funds to support growth, innovation, and operations (e.g., replacing and maintaining essential equipment and facilities).
3. College support is needed for critical equipment and infrastructure.
4. Enhance communication between the college and key stakeholders (e.g., staff, students, faculty, alumni, community partners, industry stakeholders).
5. Investigate opportunities to increase capacity to support the critical transportation needs for essential instructional, research, and engagement priorities of the Martin-Gatton College of Agriculture, Food and Environment.