

## PLANT AND SOIL SCIENCES

### MISSION

Building upon its foundation of excellence, the Department of Plant and Soil Sciences discovers, develops, and disseminates scientific knowledge to advance the management, sustainability and restoration of plant and soil ecosystems.

### VISION

The Department of Plant and Soil Sciences has preeminent programs in teaching, research, and extension that will continue to serve societal needs related to the conservation and management of natural resources linked to plant and soil ecosystems.

#### **The Department of Plant and Soil Sciences will:**

- be recognized as an outstanding Department of Plant and Soil Sciences in the United States, attracting and retaining the best students, faculty, and staff;
- develop life-long learners who understand science, think analytically, find creative solutions, treat others with honesty and respect, and are prepared to lead, serve, and provide decision makers with timely information regarding plant and soil systems;
- conduct cutting edge fundamental and applied disciplinary and multidisciplinary research with active participation of undergraduate and graduate students, land owners, and decision makers;
- provide excellent extension programs that result in an informed clientele and opportunities for economic development in the state, region, and nation; and
- facilitate communication, collaboration, and coordination among teaching, research, and extension activities both within and outside the Department, Division, and University.

### CORE VALUES

**Excellence** – We seek excellence in all our endeavors and we are committed to continuous improvement.

**Intellectual Freedom** – We believe in ethical and scholarly questioning in an environment that respects the rights of all individuals to freely pursue knowledge.

**Integrity** – We are committed to the principles of truth and honesty, and we will be equitable, ethical, and professional.

**Service** – We believe that serving others is a noble and worthy endeavor.

**Diversity** – We respect others and value diversity of opinion, freedom of expression, and other ethnic and cultural backgrounds.

**Stewardship of Resources** – We are dedicated to the efficient and effective use of resources. We accept the responsibility of the public's trust and are accountable for our actions.

## Goals, Critical Success Factors, Objectives, and Strategies

**Goal 1. Increase the department's ability to address current and future concerns of urban and rural sectors of our society related to plant and soil ecosystems.**

### **Critical Success Factors:**

- Establish a formalized mentorship for incoming faculty.
- Hold a planning retreat to examine current expertise in the department and identify voids existing or anticipated to determine positions to request and a strategy for dealing with the voids.
- Nominate at least 2 faculty members per year for regional and national awards.
- Provide temporary staffing support for a sabbatical leave for 1 faculty member per year.
- Sponsor 2 workshops per year in which recognized scientists from other institutions present cutting-edge approaches to research, teaching, and outreach.
- Submit at least 1 multi-discipline proposal per year for competitive funding that involves teaching, research, and outreach components.
- Conduct departmental "professional meetings" once per year made up of presentations from our different national meetings.
- Hold departmental faculty seminars at least once per month.
- Document the attendance of faculty members who attend at least 1 professional society meeting per year.
- At least 3 faculty members per year will attend professional meetings of societies outside of their specialty.
- Establish a web site mailbox or other method of accepting suggestions and request faculty, staff, and students to identify and describe limitations in facilities that are restricting their productivity.
- Submit 1 proposal per year to obtain funds for improving facilities.

### **Objectives:**

**Objective 1.1:** Recruit, mentor, and retain excellent faculty, staff, graduate students, and undergraduate students from diverse cultural, socio-economic, and disciplinary backgrounds.

### **Strategies:**

- Identify and nominate productive faculty for local, state, regional, and national awards and recognitions.
- Encourage utilization of sabbatical leaves to enhance professional development.
- Encourage the attendance and participation in other professional development activities.
- Examine the current expertise and identify current and future staffing priorities for faculty to meet current and future concerns of society.
- Increase our visibility as a productive and forward looking department.

**Objective 1.2:** Enhance research, teaching, and outreach programs by utilizing a holistic approach to studying complete ecosystems.

Strategies:

- Conduct seminars with invited speakers from diverse specialty backgrounds that illustrate the use of holistic methods.
- Submit multi-disciplinary proposals for extramural funding focused on complete ecosystems and the interactions between components of the system.

**Objective 1.3:** Promote interaction between research, teaching and outreach faculty.

Strategies:

- Encourage faculty to participate in review of research, teaching, and outreach proposals.
- Develop, review, submit, and carry out proposals spanning research, teaching, and outreach components of our department.

**Objective 1.4:** Build synergism among the faculty by increasing our knowledge of and appreciation for other disciplines in our department.

Strategies:

- Hold departmental seminars where faculty present their research, teaching or outreach programs and plans for a general audience.
- Encourage and mentor a colleague from another discipline to attend our professional society meetings.
- Join a colleague from another discipline to attend their professional meetings.
- Attend professional meetings of societies with common interests but different perspectives and approaches.
- Present and discuss projects formally in seminars and informally in Faculty Development Center.

**Objective 1.5:** Improve and modernize classrooms, laboratories, and research stations to meet the demands of current and future teaching, research, and outreach priorities.

Strategies:

- Establish list of limitations to faculty productivity imposed by physical facilities and associated costs.
- Prioritize needs and seek funding for high priority items.

**Goal 2. Prepare students to be life-long learners equipped with the tools: to confidently lead and serve; while asking pertinent questions and seeking creative solutions; subsequently communicating timely information to decision makers regarding plant and soil ecosystems.**

**Critical Success Factors:** (measures of the degree of success over the next 5 years):

- Define diversity in context of the Oklahoma State University community and clientele.
- Conduct a survey to evaluate secondary education student's perceptions of plant and soil science to assist in development of an undergraduate recruitment plan.
- Develop an undergraduate student recruitment plan and materials based on survey results.
- Reach students, staff, and faculty diversity in regards to life experiences, socioeconomic backgrounds, and career goals.
- Recruit for academic excellence and diversity among graduate students by recruiting a student population that is 25% dissimilar to the disciplinary norm in the unit.
- Provide funds for one faculty, graduate and undergraduate student to travel abroad.
- Have 20% of undergraduate students per semester actively engaged in research programs.
- Establish guidelines for activities acceptable for Departmental internship credit.
- Provide students training opportunities in professional lifelong learning.
- Connect 5 students per Full Time Equivalent (FTE) in formal out of class learning opportunities.
- Engage undergraduate students in extracurricular experiential learning activities in their professional field.
- Support professional development opportunities at the regional and national levels for students, faculty and staff.
- Secure funding for student professional development opportunities.
- Support the high ranking at OSU and nationally by recruiting and retaining 15 undergraduate students per instructional FTE in the department.
- Implement integrated undergraduate curriculum reflective of the diversity and unity related to land management.
- Implement integrated graduate curriculum reflective of the diversity and unity related to land management.
- Develop a system to evaluate department instructional priorities to meet curriculum needs.
- Develop a departmental system for peer evaluation for the purpose of improving instruction and sharing knowledge.
- Support 1 faculty member per year for pedagogical professional development.
- Implement plans for modification of undergraduate student advising and assignment of student to advisors.
- Increase graduate students stipend so total financial support is competitive with peer institutions.
- Provide scholarship awards to a minimum of 5% of graduate students.
- Identify new donors and increase the amount of gifts to endow the PaSS Student Enrichment Fund.
- Submit 1 competitive grant related to teaching improvement per year.

**Objectives:**

**Objective 2.1:** Diversify the student body, staff, and faculty composition in terms of life experiences, socioeconomic backgrounds, and career goals reflective of the community.

Strategies:

- Review graduate and undergraduate student recruitment plans to ensure students from all socioeconomic sections of the community are reached.
- Review the current student body, staff and faculty of the Unit
- Actively seek staff and faculty with diverse backgrounds and life experiences.
- Encourage students, staff and faculty to participate in activities that will enhance their interaction with individuals from diverse backgrounds.

**Objective 2.2:** Prepare students to be lifelong learners for the twenty-second century who are integrated problem solvers able to communicate solutions and ideas related to plant and soil systems through experiential learning and leadership opportunities.

Strategies:

- Identify qualified students to engage in undergraduate research scholars program.
- Develop mechanisms to internally recognize internship opportunities and identify potential student candidates.
- Evaluate student extracurricular activity structure to expand the number of students actively involved.
- Seek funding to increase the number of scholarships and research funding for research scholars program.

**Objective 2.3:** Develop a curriculum for lifelong learning in the twenty-second century that emphasizes integrated problem solving, communication of solutions and ideas related to land management.

Strategies:

- Review undergraduate curriculum and make modifications to reflect the diversity and common linkages within the department.
- Review graduate curriculum and make modifications to reflect the diversity, common linkages and expertise of the department.
- Review departmental graduate course offerings in view modifications of assessed needs.
- Review graduate course offerings external to the department.
- Assess and establish needed courses and faculty expertise to offer such courses.
- Review all undergraduate courses (including Special Problems courses) to increase understanding of course content and to facilitate better relationships among courses.

**Objective 2.4:** Emphasize excellence in teaching and advising.

Strategies:

- Develop a mechanism to internally recognize excellence and accomplishment in teaching and advising.
- Review and improve advisement methods for undergraduate students.
- Offer graduate courses in a timely manner.

**Objective 2.5:** Increase funding through endowments, grants and other external funding sources.

Strategies:

- Work with development officers to seek donors to support travel and other scholarships for undergraduate and graduate students.
- Develop agreements for endowments to support graduate students (for both stipends and scholarships).

**Goal 3. Create knowledge that will enhance stewardship of land-based resources by increasing agricultural productivity and sustainability while providing services demanded by society from ecosystems and landscapes, thereby enhancing economic development and quality of life.**

**Critical Success Factors:** (measures of the degree of success over the next 5 years)

- Compose and annually review a set of departmental priorities for research that leverage the strength of the faculty to build academic excellence.
- Replace the “role statement” required annually in the current faculty appraisal and development program with a statement of research focus and how it addresses departmental priorities.
- Recruit and hire scientists with priority to those with experience at a Level I research university and with demonstrated productivity competing for grants and for publishing in peer-reviewed journals that report research supported primarily by extramural funding.
- Write position description for 1 research scientist in 1 field in which the successful candidate will likely add to the ethnic diversity of the department.
- Submit annually 2 research proposals (minimum 1 as Principal Investigator (PI) and one as co-PI) per research FTE.
- Submit proposals for \$200,000/research FTE annually to federal funding agencies.
- Federal grant awards of \$50,000/ research FTE annually and \$30,000/research FTE in other extramural funding.
- Set publication expectations of 1.5 refereed journal articles per research FTE per year, and every scientist contributes a portion to this ratio relative to the scientist’s research FTE.
- Publish 1 peer-reviewed journal article per M.S. thesis and 2 peer-reviewed journal articles per Ph.D. dissertation for research-supported graduate students.
- Provide level of start-up funding for newly hired research scientists equivalent to peers
- Use funding from Oklahoma Agriculture Experiment Station (Experiment Station) (i.e., Hatch and State funds) as seed money to support grant proposals by establishing the expectation of publishing 1 refereed journal article/\$50,000 funding (to exclude scientist salaries) or a follow-up proposal for extramural funding.
- Submit proposals annually for upgrading or adding research equipment and facilities to the equivalent of 1/3 of operational funding from Experiment Station - currently about \$450,000 (or 10% of total Experiment Station funding - currently at about \$2.5M).

**Objectives:**

**Objective 3.1:** Build academic excellence by focusing research on strengths of the faculty while balancing research activities for commodities, alternative land uses, and environmental concerns.

**Strategies:**

- Balance faculty expertise to address demand for knowledge about commodities, alternative land uses, and environmental concerns.
- Assess department’s strengths at the level of individual faculty member.
- Select appropriate commodities and natural resources on which to generate regionally significant research.

- Establish priorities for natural resources research, fundamental research, and commodity research appropriate to available scientist strengths and FTE's.

**Objective 3.2:** Diversify sources of funding for research not directly supported by commodity programs that contribute to enhanced agricultural productivity and sustainability as well as to ecosystem services.

Strategies:

- Focus internal resources on programs that have the greatest potential to receive extramural funding.
- Redirect new faculty hiring to include faculty from research programs with a track record for grantsmanship.
- Leverage commodity and Experiment Station sponsored funding to support seed research to support proposals that address broader questions.

**Objective 3.3:** Increase the number and quality of proposals submitted to federal agencies with the greatest growth potential in competitive grant programs.

Strategies:

- Encourage research faculty to devote time for developing and writing grants to National Science Foundation (NSF), Environmental Protection Agency (EPA)-Science to Achieve Results (STAR), and United States Department of Agriculture (USDA), National Research Institute (NRI).
- Encourage all faculty to submit at least 1 proposal each year for external funding to support teaching, research, or outreach.
- Encourage faculty to seek academic excellence through prolific publishing in highly esteemed scientific journals.
- Focus on quality of graduate students by encouraging faculty to select graduate students capable of producing peer-reviewed scientific journal articles.
- Encourage faculty to submit proposals that fund programs for graduate students and research associates to enhance ethnic diversity.

**Objective 3.4:** Provide an effective level of intramural support for scientists and research facilities.

Strategies:

- Provide level of start-up funding for newly hired research scientists sufficient to ensure competitiveness in federal grant competition equivalent to peers.
- Provide seed money for scientists to pursue research areas with potential for federal grant funding.
- Provide matching funds for graduate student stipends supported by grants.

**Objective 3.5:** Improve and modernize laboratory and field research facilities to meet the needs of scientists competing for federal research grants.



Strategies:

- Establish priorities for supporting and updating field stations and research laboratories.
- Seek funding opportunities for upgrading stations, equipment, and laboratories.

**Goal 4. Continue to develop comprehensive outreach, service, and extension programs that result in an informed clientele with opportunities for sustained development and resource uses.**

**Critical Success Factors:** (measures of the degree of success over the next 5 years)

- Organize 1 in-service event annually to show the department's pride and accomplishments to research and extension field staff.
- Organize 1 technical forum annually to highlight program breadth and diversity in the department for our clientele as well as extension field staff.
- Update and maintain increased accessibility of current research-based knowledge via electronic, including the World Wide Web, and print media.
- Maintain an up-to-date web site designed for the general public to highlight each research, teaching, and extension program in the department, with emphasis on maintaining the excellent image of the Department, Division and University.
- Submit at least 1 proposal per extension FTE per year to increase outreach and service activities that directly add value and sustainability to crop industries and natural resources.
- Develop a program emphasis to assure outreach activities are directed to ethnic and social diversity and to urban clientele outside mainstream crop production, i.e., ranchettes, hunting, fishing, hiking, etc.
- Each faculty member will produce an informational instrument relevant to natural resource management every 5 years.
- All faculty members will produce an informational instrument relevant to traditional agricultural production every 5 years.
- Present at least 2 service performances each year per faculty member to organizations outside the university and professional societies, representing the whole current department.

**Objectives:**

**Objective 4.1:** Improve technical knowledge of extension field staff for the enhancement of economic development information to our diverse clientele.

Strategies:

- Provide a series of in-service training opportunities each year for Cooperative Extension Field Staff. These sessions will provide an opportunity for technical updates of all of departmental research and teaching activities.
- Disseminate information about educational opportunities (e.g., commodity group meetings, scientific meetings, etc.) to all extension field staff, especially natural resource specialists.
- Provide assistance to field staff in preparing and presenting scientific results at professional meetings.

**Objective 4.2:** Continue successful, high-impact outreach programs delivered directly to clientele, including youth, and enhance dissemination through up-to-date information technology.

## Strategies:

- Improve support for developing and distributing research-based information to clientele via print and electronic media.
- Develop broad based capabilities for on-line outreach meetings and conferences.
- Improve support for publishing and distributing research based information through traditional hard copy publications, electronic formats, and other University publications.
- Provide support for developing and maintaining multiple objective decision support software systems and web sites.

**Objective 4.3:** Expand current and develop new educational and service programs that encourage sustainable crop production and land use while enhancing economic development and enhance quality of life for urban and rural Oklahomans.

## Strategies:

- Identify opportunities to expand current high impact programs to meet the needs of socially diverse clientele.
- Assess needs for, and prioritize the development of interdisciplinary teams to address the Division initiatives.
- Leverage extramural funding to enhance development of outreach teams to develop and deliver a wide range of technical information.
- Assess and prioritize needs of educational programs for owners of recreational lands.
- Encourage the faculty to participate in seminars and conferences that add breath to their existing knowledge.
- Portray a complete current image of the department in presentations to various non-academic groups such as civic clubs, commodity commissions (i.e., wheat, peanut, soybean, and sorghum), producer associations (i.e., alfalfa, forages, and crop improvement), certified crop advisors, high school workshops and competitions, and student clubs, as well as at field tours and field days.

**Goal 5. Demonstrate excellence and promote our image as an outstanding faculty dealing with plant science, soil science, and natural resource management.**

**Critical Success Factors:**

- Publish a newsletter for alumni and clientele 2 times per year.
- Update web page each month highlighting programs for general readers.
- All faculty will attend at least 1 professional meeting per year.
- Host at least 1 regional or national workgroup meeting within the next 5 years.
- Appoint an awards and recognition committee to identify awards, potential departmental recipients, and assist with nomination packets.
- Prepare and distribute press releases for all faculty members, students, and staff receiving awards.

**Objectives:**

**Objective 5.1:** Engage alumni and clientele in programs that inform them of activities, achievements, and opportunities within the department.

Strategies:

- Publish a departmental newsletter highlighting events and activities.
- Maintain an informative departmental web site with summaries of research, extension, and teaching projects highlighted for the general public.

**Objective 5.2:** Publicize achievements of departmental students, faculty, and staff.

Strategies:

- Encourage faculty to take leadership roles in professional societies and regional, national, and international workgroups.
- Proactively identify and nominate productive faculty for local, state, and national awards and recognitions.
- Maximize exposure of teaching, research and outreach programs through scientific journals, popular press, websites, national and international conferences, competitive student activities, field days, youth events, commodity organizations.
- Insure that students, staff, and faculty who receive awards or recognitions are appropriately recognized in the local and state news so that the department and Division can showcase the recipient.