

Review OSU Soil Science Graduate Program: May, 2015

Review Committee: Jan W Hopmans (Chair), Nancy Hess (Pacific NW National Laboratory), Andreas Schmittner (OSU, Graduate Council) and Jessica White (OSU, Graduate School and College of Science)

1. SUMMARY

The OSU Soil Science Program is one of two graduate programs of the Crop and Soil Science Department. Partly, because of the increase in funding received by the recent development of E-courses by Soils faculty and associated tuition waivers, total graduate student funding has increased, resulting in a significant increase in graduate students to a healthy-size cohort of about thirty. Consequently, the Soil Science (SS) program is now a strong program with committed faculty and among a decreasing number of stand-alone SS programs nationally. Students are generally very satisfied, with most aspects of their graduate studies, and graduate at a rate equal or better than the College or campus average.

However, because of highly uncertain future program funding of tuition waivers and the campus and college focus on E-course instruction, continued program planning will be required to develop alternative incomes to maintain student numbers and program quality. Opportunities may present themselves, if SS faculty increasingly engage with their colleagues within the Department as well as with other related departments and programs on the OSU campus, thereby increasing student enrollment in their coursework. Additional program income may be generated by seeking mechanisms for cross-listing and/or developing new courses and the consideration of hiring lecturers or engaging Cooperative Extension faculty to teach additional E-courses in soil-related topics, as well as by taking advantage of federal research funding opportunities in the Food-Water-Energy Nexus.

As OSU continues to focus on developing E-courses and generating additional income in doing so, the SS program will have to balance teaching such E-courses together with high quality core course instruction, so as to sustain and improve their national ranking. The review committee feels strongly that this would require departmental support, and that planning for such a sustainable future will require joint planning efforts.

Consensus Statement to be included in both Crop and Soil Science Graduate Program Reviews:

Therefore, it is highly recommended that the Soil and Crop Science faculty coordinate with the Department Head, in developing a departmental Strategic Plan that lays the foundation for competitive and highly-ranked teaching and research programs. Both the Crop Science and Soil Science Graduate Program Review committees were unanimous in their recommendation for both programs to seriously consider a joint strategic planning initiative, as the level of success of departmental planning will largely impact the vitality and quality of both Graduate Programs.

2. MISSION AND GOALS:

Mission:

1. To develop and deliver knowledge of plant-soil systems: learn, discover, and grow,
2. To be recognized regionally, nationally, and internationally for scholarly work, effective student training, and innovative and relevant extension education and service programs,
3. To be aligned and programmatically integrate with OSU and externally with partner resources,
4. Soil Science Graduate Program supports missions 1-3 above of the Department of Crop and Soil Science through training of M.S. and Ph.D. students in Soil Science and related graduate programs on the OSU campus.

Goal:

To prepare the next generation of leaders in terrestrial ecosystem sciences by:

1. Producing M.S. and Ph.D. soil scientists that have the knowledge and skills to become employed and successful in their profession,
2. Provide a supportive and intellectually stimulating environment for Soil Science graduate students to develop their potential, and
3. Offer a modern, comprehensive graduate curriculum in Soil Science that serves both Soil Science graduate students and the much larger population of graduate students in allied areas.

3. SWOT ANALYSIS

STRENGTHS:¹

1. Strong sense of identity within Soil Science (SS) program, with pillars in soil chemistry, soil physics, soil biology and pedology
2. Faculty are academically strong, interdisciplinary, diverse, engaged, and committed to the success of the soil science graduate program at OSU
3. Faculty and students have developed a culture of collaboration in both research and teaching with other related departments, graduate programs, and Colleges such as with College of Earth, Ocean, and Atmospheric Sciences (CEOAS), and graduate programs in Water Resources and Environmental Sciences. Also the creation of the Soils Café has been a great way for students and faculty to interact
4. SS Faculty and Department of CSS are experienced with the Land Grant mission, and College of Agricultural Sciences has infrastructure of experimental fields and buildings to

¹ Strengths: Program characteristics that give it an advantage over others (assets, uniqueness) in accomplishing its mission

serve the State of Oregon, as well as have these experimental stations available for collaborative research outside the SS Program

5. In the past 5 years, student numbers have increased and reached a critical cohort number of thirty, allowing greater diversity of thought and opportunities for scholarly interactions. Students recently self-organized through the Association of Graduate Soil Scientists (AGSS) that is providing significant service to the Soils Program and CSS department
6. Graduate students are currently well-funded through GTA and GRA appointments, as well as through external funding and fellowships
7. Graduate students are engaged, committed, and generally very satisfied with the Program. Additionally, they appear to be are successfully employed after graduation
8. Soil Science program invested in teaching E-campus courses and these have been successful ventures financially, having provided GTA support for Soil Science graduate student funding and tuition waivers, as well as reaching a large number of OSU undergraduate students
9. Time to degree completion is equal to or better than college/campus average for both M.S. and Ph.D. students
10. Availability of instrumentation and laboratory spaces is adequate and faculty and graduate students are generous in sharing equipment between faculty laboratories
11. Availability of experiment stations across the state.

WEAKNESSES²:

1. Demographics of SS faculty with some senior faculty near retirement, realizing that current College policy allows hiring of roughly one faculty for every two retirements
2. Program-specific learning outcomes are quite detailed and specific and do not clearly map to current course offerings and students experiences. As a result, it is unclear how graduate students currently meet and demonstrate they have met these learning outcomes
3. Lack of incentives to teach (under)graduate courses or advise students outside the program/department, as faculty/program do not receive credit/funding for those courses/students
4. Though the ratio of standalone to slash courses has increased, graduate students indicate they want more standalone core and/or elective course and special topics courses.
5. General lack of timely student performance data and other core metrics for student progress and program ranking among national-recognized soil science programs, thereby

² Weaknesses: Program characteristics that put program in disadvantage in achieving mission and goals (what could be done better)

impairing benchmarking with other graduate programs in the College and campus, as well as nationally

6. Soil Science vision and goals are rather generic, and need a revision to be recognized as a unique (inter)disciplinary program with ambitions of improved quality and ranking
7. Despite that the SS program consists of 8 faculty with general strong research and teaching programs and was expected to be among the top national programs in the nation among the 17 soil science doctoral programs that were compared by NRC, the OSU soil science program was ranked 8th
8. Though the SS and CS programs were merged into the CSS department some 15 years ago, there continues to be a lack of cohesion and a sense of a 'forced marriage', resulting in the lack of a common departmental vision and joint academic planning. This 'silo' effect is even more obvious because of the physical separation of both programs between buildings.

OPPORTUNITIES³:

1. Find common goals and define joint faculty lines between Crop and Soil Science programs in the Department of CSS, for example in prioritizing faculty FTE in Soil-plant-atmosphere relations, Sustainability, and Rhizosphere science
2. Program is ideally positioned to take advantage of increased federal funding for interdisciplinary research in sustainable Food-Energy-Climate nexus area (NSF, NIFA, DOE)
3. Increasingly work closely with affiliated faculty/campus programs towards cross-listing courses so as to increase student numbers in SS graduate courses and the number of course offerings for SS graduate students
4. Consider to develop 1-year non-thesis professional MS program and/or certification courses, augmenting income to the program
5. Consider to hire adjunct and/or lectures or engage Cooperative Extension faculty to teach additional E-courses in soil-related topics, such as sustainability, soil health, with broad additional interest off-campus
6. Develop an academic plan with Crop Science faculty for the purpose of joint academic planning, anticipating future college, campus and State priorities, as well as for joint faculty positions with other campus units
7. Recruit the best possible faculty to compete for federal research funding and the ability to attract and fund top caliber graduate students.

³ Opportunities: External elements (e.g. emerging trends) that program could exploit/develop to its advantage in meeting goals

THREATS⁴:

1. The SS program is vulnerable, as it barely meets the OSU Graduate Studies criterion of graduating 5 MS and 2 PhD students per year, at a minimum
2. College and campus is heavily and disproportionately focused on metrics to financially support (under)graduate programs, rather than on the curriculum/program quality (e.g. emphasis on E-learning and student numbers)
3. No consensus/decision on CAL model, its importance in the unit and proposed funding
4. Aging infrastructure (buildings, equipment), including field facilities
5. Huge uncertainty and lack of clarity of future Tuition Remission funding to departments and programs, thereby jeopardizing successful academic planning
6. Decreasing graduate student funding policies may create an academic environment with fewer graduate students and more postdoctoral scientists so as to maintain research productivity
7. Campus policy to increase E-course instruction, thereby incentivizing departments to invest faculty time in development and teaching of E-courses, taking significant time away for high quality graduate student instruction and advising

4. RECOMMENDATIONS:

1. Develop new department-specific learning outcomes for SS program as a whole, and indicate to which extent each SS course would meet these learning outcomes
2. Review core course curriculum and consider to develop additional graduate core and/or elective courses, special topic courses, and cross-list with other allied graduate programs on campus
3. Ensure that SS program has available student progress data in a timely manner, and that the Department/College provides the right and complete information for program ranking among other national soil science programs
4. Revise mission, vision and goals of Soil Science program, to better position Soil Science within the department, college and campus as a unique program with aspirations for improved quality, recognition, national ranking and campus collaborations
5. Develop a departmental strategic plan jointly with the CS and SS faculty/programs, laying out common vision, goals, and consensus of academic planning for faculty lines, including those jointly between CS and SS programs and with other academic units on the OSU campus
6. Anticipated reduced GTA funding and tuition remission allocation will need the development of a graduate student funding plan that increasingly will have to depend to (a) increased competitiveness in attracting federal research funding and (2) donors/gifts and merit fellowships

⁴ Threats: External factors to program that may jeopardize meeting program goals or make program more vulnerable

7. Review CAL (centralized analytical laboratory) financial plan, and if not viable for the department to consider using the facility as a shared departmental teaching laboratory. Also SS graduate students were asking for a instrumentation course
8. Develop graduate student funding plan that is sustainable, and balances income from E-course instruction, external research funding, and endowments/fellowships.

Overall Recommendation: The Soil Science Program at OSU is of sufficiently high quality to sustain itself as a stand-alone graduate program, with faculty highly motivated to increasingly engage with Crop Science and affiliated campus programs towards improving its quality and national ranking.

Therefore, we strongly recommend that the Department of Crop and Soil Sciences initiate a process of STRATEGIC PLANNING that delivers a consensus Strategic Plan (SP) with both the Crop and Soil Science faculty, laying the foundation for competitive and highly-ranked teaching and research programs at Oregon State University.