



THE OHIO STATE UNIVERSITY

COLLEGE OF FOOD, AGRICULTURAL,
AND ENVIRONMENTAL SCIENCES

Academic Programs

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February 28, 2020

Dear Dr. Smith,

The College of Food, Agricultural, and Environmental Sciences is requesting Council on Academic Affairs approval for a proposed new undergraduate multidisciplinary major, "Sustainable Agriculture", leading to a Bachelor of Science in Agriculture. This proposal has been developed as a collaboration between the Department of Horticulture and Crop Sciences (lead department), the Department of Entomology, and the School of Environment and Natural Resources, along with more than 20 OSU Faculty members throughout the university, and as a result of funding through the USDA Higher Education Challenge Grants process. The funding also led to the formation of the Ohio Sustainable Agriculture Education Network (OSAEN), of which this proposed major is a critical component of the educational partnership.

This proposal has been approved by the Academic Affairs Committees of the respective contributing academic units and by the College Academic Affairs Committee. Please let me know if any additional information is needed in support of this request.

Sincerely,

Jeanne M. Osborne
Assistant Dean for Academic Affairs
College of Food, Agricultural, and Environmental Sciences
The Ohio State University
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FULL PROPOSAL FOR THE ESTABLISHMENT OF A BACHELOR OF SCIENCE MAJOR IN SUSTAINABLE AGRICULTURE

Letter from the Dean of the College of Food, Agricultural and Environmental Sciences (CFAES).

I. GENERAL INFORMATION

- A. **Name of Proposed Major:** Sustainable Agriculture
- B. **Title of Degree:** Bachelor of Science
- C. **Proposed Implementation Date:** Fall 2020
- D. **Academic Unit/Department:** College of Food, Agricultural, and Environmental Sciences (CFAES) Interdepartmental degree with Horticulture and Crop Sciences (HCS) being the Administrative lead department along with the School of Environment and Natural Resources (SENR) and Department of Entomology

II. Rationale for the Proposed Major:

- A. **Rationale/Purpose of the Proposed Major:** The [CFAES 2009-2013 Strategic Plan](#) included “innovative and/or unique degree programs, curricula, courses, and/or academically based co-curricular experiences that represent emerging areas in agricultural sciences and natural resources”, including “AgBiosciences, AgroEcology, Bioproducts, Bioresources, Culinary Science, and Sustainability.” Furthermore, the most recently published [CFAES plan](#) includes “Environmental Quality and Sustainability – Working to understand, protect, and remediate the environment and ecosystems to ensure long-term sustainability.” The Ohio State University Sustainability Institute identified sustainable agriculture as an important opportunity for new curriculum development. This proposal clearly reflects the College and University goals for new curriculum that address sustainability using agroecological principles.

The term “sustainable agriculture” refers to food and fiber production that enhances environmental quality, recycles farm resources, leverages natural biological processes, is economically viable and strengthens rural communities. At its core, sustainable agriculture is about managing a farm as an integrated system, including plants, animals, soils, people, and with connections to economies and surrounding communities. The sustainable agriculture degree at The Ohio State University will differ from existing agricultural degrees offered by OSU, which specialize in particular aspects of agriculture (crops, livestock, markets, rural communities, etc.), in that it will provide students with an interdisciplinary and holistic lens for thinking about farming as an integrated system, including diverse farms and neighboring communities, and within which economic, social, and environmental considerations must be balanced. This program will be rooted in inter- and multidisciplinary coursework, hands-on farming experiences, and developing key employer-requested skills like teamwork and leadership. Students pursuing the program will not only learn about diversified agriculture as a practice but will graduate with valuable transferable skills in systems thinking, problem solving, written and verbal communication, management, collaboration and entrepreneurship. It will teach them to think critically about environmental sustainability, human-environmental interactions, and our changing food system, preparing them to perform in and create cutting edge jobs in the 21st century economy.

The need for a Sustainable Agriculture major stems from the intersection of a passion that young people throughout the nation display for sustainability, and the economic constraints they face. Certainly, in Ohio and across the country, sustainability is a major concern for today’s students (SELC, 2019). Because sustainable agriculture and food systems provide a tangible and immediate goal, we see interest in sustainable agriculture degree programs

across the US (see the [USDA National Agriculture Library listing of sustainable agriculture programs](#)). Most young people wishing to establish a career in farming, unless they are already part of a farm family and about to inherit substantial land and capital, will have to start small and find a way to create markets and a production system that is viable for their circumstances. The specialized agriculture degree programs that are well developed at land grant colleges of agriculture (e.g. agronomy, dairy science, etc.) do not provide what these students are looking for, particularly those who do not already have a planned specific role on a family or corporate farm. Students who will be creating their own careers in agriculture, or working for companies that have a specific interest in sustainable production practices, will need a more holistic training that will include the basic elements of sustainable agriculture (Earles 2005) including: markets and adding value, soil health, protecting water quality, managing pests ecologically, maximizing biodiversity, and taking an agroecosystem perspective on the farm and surrounding landscape. Many of these students will not be the typical college students for whom a post-secondary 4 yr degree will quickly follow secondary education (more on this under IV G below).

Many community colleges, as well as the CFAES Agricultural Technical Institute (ATI), are responding to these needs with certificate and associate degree programs in sustainable agriculture and food systems. At the same time, across the nation many students who desire a baccalaureate degree cannot afford to attend a 4-year residential degree program, and so begin their post secondary education at a community college close to home, keeping expenses low for the first year or longer, and then completing the program at a state college or university. Despite the opportunity these trends represent to increase the flow of students toward baccalaureate agricultural degrees, only one sustainable agriculture baccalaureate major exists in Ohio, at Central State University, to which the certificate and associate programs can bridge. The Ohio State University is poised to provide a sustainable agriculture degree program giving ATI and community college students the opportunity to continue their education and earn a baccalaureate degree. A USDA Higher Education Challenge grant to The Ohio State University (Casey Hoy, PI) entitled “A Statewide Network for Multiple Pathways to a Baccalaureate Degree in Sustainable Agriculture” has supported work on this proposal as well as the coordination of a statewide network of complementary programs in higher education.

- B. Unique Characteristics/Resources for the Proposed Major:** We expect to impact knowledge and practice regarding sustainable agriculture education, increase the number and diversity of students who enroll in baccalaureate programs in agriculture, build a common foundation of student knowledge and experience in sustainable agriculture, especially in practical skills and systems thinking capacities and entrepreneurship, and prepare our students for a wide range of possible careers from small business owners in their own communities to sustainability officers for large corporations. Six core instructional themes, drawn from recent research in education, sustainable agriculture, social networking and entrepreneurship were identified in the USDA proposal that led to the curriculum we now propose and inform the learning goals for the proposed major: 1.) Critical, integrative and reflective thinking and action; 2.) Foundational knowledge in sustainable agriculture; 3.) Practical farming experience; 4.) Linkages between farm practical experience and coursework, especially STEM; 5.) Entrepreneurship in sustainable agriculture and food systems; and 6.) Leadership, teamwork and collaboration training and practice.

Many elements of our proposal build on successful approaches pioneered elsewhere, such as hands-on farm work tied directly to classroom curriculum. Several key aspects of our proposed degree program are novel, however, and allow us to build and test a new model for

sustainable agriculture education: community connections inherent in service learning and entrepreneurship; leadership, multidisciplinary teamwork and entrepreneurial experience using social media such as localfoodsystems.org; social entrepreneurship to address community needs as part of the degree program; systems thinking applied to agriculture and business.

- C. **Benefits of Proposed Major:** The proposed major provides several benefits to students, Northeast Ohio, and the State at large. CFAES is committed to providing quality education through real-world learning experiences that culminate in competent, self-reliant and productive citizens in a global society. Providing students with teaching needed to smoothly transition into a job upon graduation, or to create a livelihood, and to function productively and advance in that career is the ultimate objective of CFAES and the university. The proposed major is intended to help students achieve that goal. The sustainability of our food system is at the forefront of many conversations across CFAES, the university, communities, regions, the nation and the globe. Providing students with the opportunity to study the food system from the perspectives of natural and social science, systems thinking, local-global landscapes and business and entrepreneurship while building skills in hands-on and experiential food production, teamwork, leadership and communication will ensure that our graduates are prepared to enter the job market with desired skills and experience.
- D. **List of Similar Majors at Other Institutions:** We have formed an inter-institutional network, the Ohio Sustainable Agriculture Education Network (OSAEN), which consists of faculty and administrators from OSU (including faculty from both the Wooster and Columbus campuses of CFAES), Central State University (CSU), Lorain County Community College (LCCC), and with past participation of Zane State, Stark State and Owens Community College. The purpose of this network is to support the development and transferability of sustainable agriculture degree programs across the state of Ohio through consistent approaches to sustainable agriculture curricula. As noted above, the network is supported by a USDA Higher Education Challenge Grant.

OSAEN is currently developing the first Transfer Assurance Guide (TAG) in agriculture, to be submitted to the Ohio Department of Higher Education (ODHE) as part of our work on the USDA HEC grant. The establishment of a TAG could expand the number of institutions across Ohio that offer sustainable agriculture degree programs and thus increase the potential for transfer opportunities into undergraduate programs at OSU, as well as recruitment for graduate training at OSU. ODHE has advised that having memoranda of understanding between participating institutions would facilitate the establishment of a TAG. Therefore, agreements on course equivalence are being explored between OSAEN member institutions – OSU/CFAES, CSU and LCCC. We plan to proceed with formalizing these agreements after the OSU major has been approved.

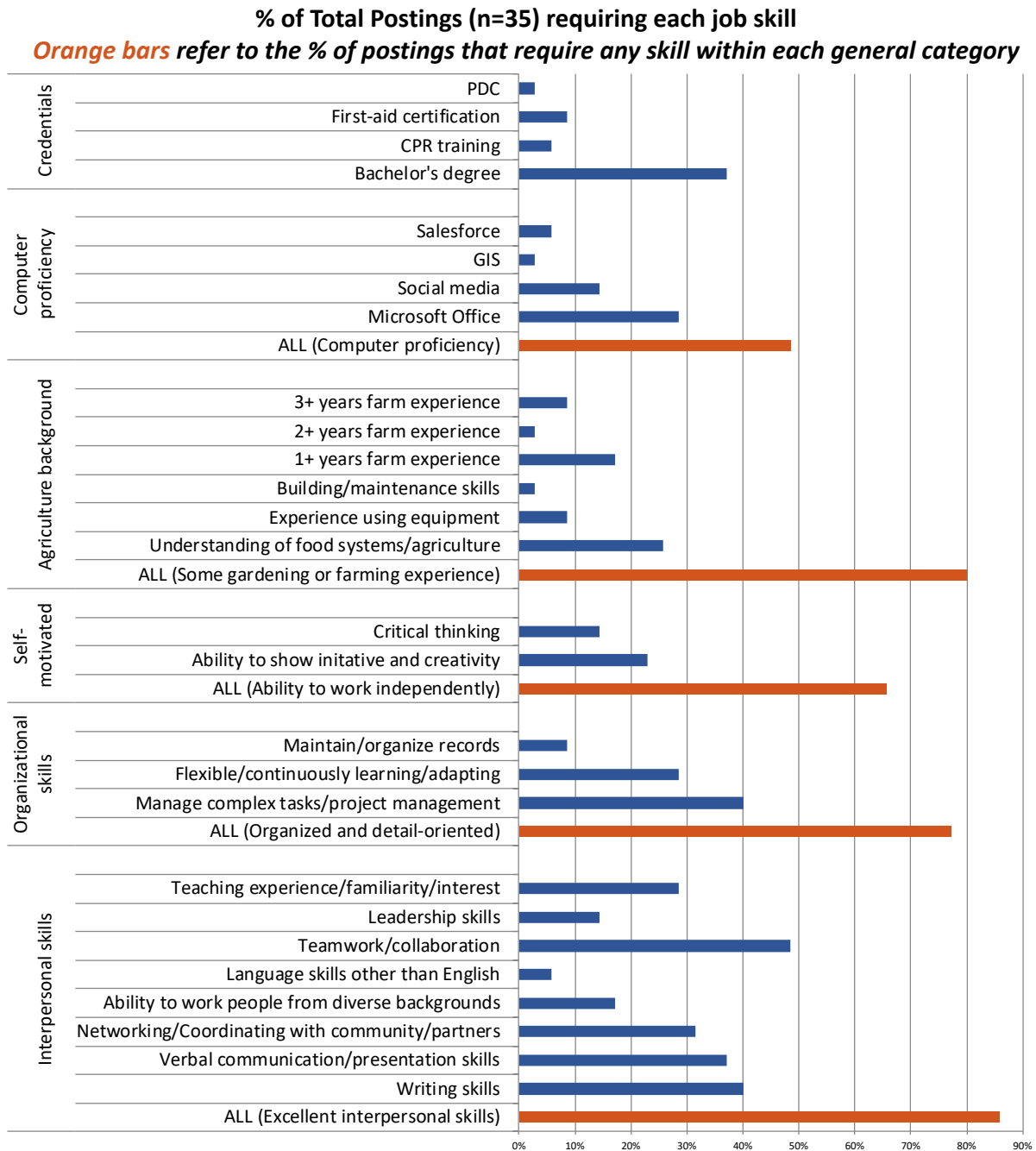
In addition to partnering with OSAEN members to develop consistent goals for a sustainable agriculture major, we have worked with over 20 OSU faculty members from across the university including CFAES, College of Arts and Sciences, John Glenn College of Public Affairs and Knowlton School in developing the proposal (see section I for the list of collaborators and their academic units). We have also engaged the assistance of Dr. Theresa Johnson of the University Institute for Teaching and Learning. Theresa led the backwards design process that resulted in the proposed curriculum.

- E. **Enrollment Patterns of Similar Majors:** We expect a sustainable agriculture major to appeal to a wide range of students from both rural and urban backgrounds for its

sustainability ethic and its entrepreneurial and employment opportunities. The Environment, Economy, Development and Sustainability (EEDS) major at OSU had 100 students by the end of its second year. Our research indicates strong interest in this degree program, suggesting that it could be on par with EEDS enrollment. Enrollment in sustainable agriculture degree programs at other universities includes both the University of California Davis (UC Davis) and University of Massachusetts Amherst (UMASS), both of which offer similar degrees to the one we're proposing. The UC Davis program had 30 first-year students enrolled in the program's inaugural year of 2012, and has since increased to approximately 90 – 110 students. Similarly, the UMASS established a sustainable agriculture degree in 2006 enrolling 27 students. By 2016 their enrollment had grown to a total of 140 students.

We anticipate the majority of our students to be enrolled full-time, with many completing their practical experience and internship requirements during the summer. The USDA HEC grant along with other funding sources are now supporting a farm manager for the student farm at the CFAES Waterman Agricultural and Natural Resources Laboratory. The student farm at Waterman could allow students to gain hands-on experience in sustainable agricultural production and food safety techniques during the academic year as well as over the summer months.

- F. **Career Opportunities:** Using an online search of existing degree programs and job advertisements, we've assembled a list of jobs, job skills, and broad learning outcomes that would inform our goals for graduates of this proposed program (see graph below). We found that students who graduate with a sustainable agriculture degree are poised to enter the workforce as farmers/farm managers, agricultural research technicians, corporate sustainability leaders, policy developers, environmental and social justice champions and farm educators. Our research indicated that successful students should demonstrate teamwork, holistic and interdisciplinary thinking, entrepreneurship, and leadership skills in addition to practical skills in agricultural production. These qualities will enhance their prospects for both employment and farm business development in a variety of contexts serving a variety of stakeholders. Although many of the job advertisements that were included in the analysis did not specifically mention a requirement of a baccalaureate degree, preferring to name the qualities expected in their employees instead, the degree we propose should provide a distinct advantage in securing one of these jobs.



G. License/Certificate: N/A

III. Assessment Plan Goals/Objectives/Evaluation:

- A. Sustainable agriculture embeds a land and community ethic within an interdisciplinary field of study in the natural and social sciences. Teaching sustainable agriculture should expose students to a wide range of ethical considerations, beliefs and attitudes; and students' own diverse backgrounds should be respected and supported as they develop a land ethic. Sustainable agriculture practices and insights are dynamic and emerging (Peters, 2009), and definitions of sustainability typically refer to time scales of several generations, complicating predictions about what practices will result in sustainable farming over generations. Therefore, a sustainable agriculture curriculum begins with understanding, respecting, and building on students' hopes, interests, beliefs, and commitments to balancing social,

environmental and economic concerns at individual, farm, community and societal scales. The opportunity to achieve such a holistic outlook is expected to draw a wide range of students, including many not obviously inclined toward agricultural studies. Creating a student-centered curriculum, especially one with opportunities for multi-institutional coordination, is consistent with several major developments in educational theory and practice: an on-going paradigm shift in undergraduate education from a reliance on lecture-discussion modes of teaching to inquiry-based learning (Aplin, 2008; Guskin, 1996) based on a need to understand and solve problems (Johnson & Johnson, 1996); a concurrent shift from unassailable knowledge transfer to situated learning, student empowerment and multiple perspectives (Scardamalia & Bereiter, 1996; Harding, 1996; Hooks, 2003, 1994; Freire, 2006); and recognition of the fundamental importance of students' interactions with phenomena "as an 'on ramp' to help the learner build familiarity with the natural and designed world" (National Research Council, 2000, p. 295).

In combination, these factors point to several key considerations for the design and implementation of a sustainable agriculture curriculum at the baccalaureate level. Our intent is to transcend rote learning and the isolated, mechanistic memorization of facts, concepts and usage of tools. We will promote students' over-arching, cross-disciplinary, mental frameworks grounded in classroom learning as well as on-site experience (Higgs & McCarthy, 2005; Bell et al. 2009); skillful adaptations of their knowledge, tools and practices to novel circumstances (National Research Council, 2000); and understanding and growth from diverse encounters and experiences (Harding, 1996); and assess their problem-solving efforts (Kolb, 1984).

In sum, attending to how students build on previous experiences and learning, how they organize and act on learning, and how they maintain a critical perspective while staying open to insights of others highlights the importance of building measurable, metacognitive development into our sustainable agriculture curriculum. A metacognitive approach to instruction helps students "learn to take control of their own learning by defining learning goals and monitoring their progress in achieving them." (National Research Council, 2000, p.18). Therefore, we must recognize as essential those tools and approaches that help us build successful team workers, collaborators and leaders who connect knowledge from across disciplines, integrate theory and practice, and successfully recognize and engage with diverse stakeholders and points of view (Crawford et al. 2011, Goecker et al. 2005).

To design our curriculum with these broad considerations in mind and with the disciplinary expertise of a large team of collaborators, our design team used a backwards design process, guided by Teresa Johnson of the University Institute for Teaching and Learning. We first identified goals for all students, then outcomes that show that the goals have been reached, and finally proficiencies that should be assessed to ensure that all students reach those goals while they complete their degree. We identified eight goals that could be met by twenty-nine outcomes, two of which are repeated under more than one goal. The goals and outcomes of the Sustainable Agriculture curriculum are as follows. **Upon successful completion of the Sustainable Agriculture program:**

Goal 1: Students will understand agricultural production systems and agroecological principles, and apply knowledge to design and enhance the sustainability of agricultural systems.

Outcomes:

1.1 Analyze the agricultural science of plant and livestock production systems.

- 1.2 Apply natural science underpinnings of sustainable agriculture to agroecological understanding of farming practices.
- 1.3 Describe resources for and constraints on contemporary farm production systems (ecological, social and economic).
- 1.4 Incorporate and quantify ecosystem services at work in production systems.
- 1.5 Design production systems that foster biotic synergies and preserve natural resources to promote ecosystem and human health, based on ecological principles.
- 1.6 Understand how research in agroecology and sustainable agriculture is conducted.

Goal 2: Students will understand the social, cultural, economic and political foundations of agriculture and food systems.

Outcomes:

- 2.1 Describe resources for and constraints on contemporary farm production systems (ecological, social and economic).
- 2.2 Outline the social, economic and political forces that have shaped and can shape sustainable agriculture and food systems.
- 2.3 Describe the ethical constraints on food system development and sociocultural well-being.

Goal 3: Students will apply systems thinking to sustainable agriculture and food system problems and opportunities.

Outcomes:

- 3.1 Conceptually diagram and describe the elements or components, structure and function of complex systems.
- 3.2 Recognize and incorporate into design and planning systems key systems concepts including trade-offs, feedback loops, direct and indirect effects, synergies, and emergent properties.
- 3.3 Apply systems thinking for holistic solutions in planning and problem solving, particularly solutions that consider multiple spatial and temporal scales.
- 3.4 Explain how natural and human systems feedback on one another, and the interactions between social, environmental and economic dimensions of agricultural ecosystems.

Goal 4: Students will understand local and global agricultural landscapes across spatial and temporal scales, using a multidisciplinary perspective.

Outcomes:

- 4.1 Evaluate agricultural systems from different times or places.
- 4.2 Analyze how matter and energy flows within and through agricultural landscapes.
- 4.3 Analyze how livelihoods are reliant on and affected by the landscape context.
- 4.4 Evaluate the global connections in markets and food production systems.
- 4.5 Manage spatial and temporal variability of elements of production.
- 4.6 Evaluate agricultural systems at the landscape scale and design farm- and field-scale interventions with an understanding of broader regional impacts.

Goal 5: Students will understand and apply entrepreneurship and agribusiness principles for sustainable agriculture and food systems.

Outcomes:

- 5.1 Describe resources for and constraints on contemporary farm production systems (ecological, social and economic).
- 5.2 Apply key principles of agribusiness management, marketing and finance.
- 5.3 Evaluate core business records and financial statements and other critical financial data in support of starting and running an agricultural enterprise.
- 5.4 Demonstrate ethical behaviors in food system business management.

Goal 6: Students will apply skills and knowledge gained towards hands-on management of sustainable agricultural systems.

Outcomes:

- 6.1 Implement best management practices for the agroecological management of biotic (e.g. crop, pest, etc.) and abiotic (e.g. water, nutrients, etc.) aspects of sustainable agricultural production systems.
- 6.2 Implement food safety best management practices to promote human health in food production.

Goal 7: Students will understand team dynamics and how to be an effective team member or leader.

Outcomes:

- 7.1 Adjust personal interactions according to personality type and across diverse viewpoints.
- 7.2 Contribute effectively to a team's success either as the acknowledged team leader or as one of the team members.

Goal 8: Students will communicate effectively to a diversity of audiences using various modes and media.

Outcomes:

- 8.1 Construct and deliver an effective presentation with essential elements of scientific talk.
- 8.2 Communicate effectively to both a technical and non-technical audience on current topics in agriculture.
- 8.3 Effectively engage with diverse perspectives in agriculture and communicate both sides of controversial issues.
- 8.4 Communicate well across cultural and language differences.
- 8.5 Apply key principles of agribusiness management, marketing and financing (Note: under this goal communication skills specific to marketing a new product, policy or practice).

B. Methods for Assessing Educational Goals and Objectives: Learning objectives and outcomes will be assessed by the following (details in the table below):

1. Exams/quizzes
2. In class assignments
3. Homework
4. Written assignments
5. Group or individual projects
6. Lab reports
7. Oral presentations
8. Other assignments that address specific outcomes

Table of specific methods for assessing learning outcomes:

	Learning Outcome	Assessment Method(s)
1.1	Analyze the agricultural science of plant and livestock production systems.	Homework, Group Project, Oral Presentation
1.2	Apply natural science underpinnings of sustainable agriculture to agroecological understanding of farming practices.	Exam, Written Assignment, Oral Presentation
1.3	Describe resources for and constraints on contemporary farm production systems (ecological, social and economic).	Exams, Quizzes, Written Assignment
1.4	Incorporate and quantify ecosystem services at work in production systems.	Exam, Quiz and Group Project
1.5	Design production systems that foster biotic synergies and preserve natural resources to promote ecosystem and human health, based on ecological principles.	Exam, Written Assignment, Group Project
1.6	Understand how research in agroecology and sustainable agriculture is conducted.	Lab Report, Group Project, Written Assignment
2.1	Describe resources for and constraints on contemporary farm production systems (ecological, social and economic).	Exam, Quiz and Written Assignment
2.2	Outline the social, economic and political forces that have shaped and can shape sustainable agriculture and food systems.	Exams, Written Assignment, Group Project
2.3	Describe the ethical constraints on food system development and sociocultural well-being.	Exam, In Class Assignment, Written Assignment
3.1	Conceptually diagram and describe the elements or components, structure and function of complex systems.	Exam, Written Assignment
3.2	Recognize and incorporate into design and planning systems key systems concepts including trade-offs, feedback loops, direct and indirect effects, synergies, and emergent properties.	Exam, In Class Assignment, Oral Presentation
3.3	Apply systems thinking for holistic solutions in planning and problem solving, particularly solutions that consider multiple spatial and temporal scales.	In Class Assignments, Written Assignment
3.4	Explain how natural and human systems feedback on one another, and the interactions between social, environmental and economic dimensions of agricultural ecosystems.	Exam, In Class Assignment and Written Assignment
4.1	Evaluate agricultural systems from different times or places.	Exams, Quiz, In Class Assignment
4.2	Analyze how matter and energy flows within and through agricultural landscapes.	Exam, Homework, Group Project

4.3	Analyze how livelihoods are reliant on and affected by the landscape context.	Exam, In Class Assignment
4.4	Evaluate the global connection in markets and food production systems.	Exams, Quiz and Written Assignment
4.5	Manage spatial and temporal variability of elements of production.	Exam, Homework, Group Project
4.6	Evaluate agricultural systems at the landscape scale and design farm- and field-scale interventions with an understanding of broader regional impacts.	Written Assignments, Group Project
5.1	Describe resources for and constraints on contemporary farm production systems (ecological, social and economic).	Exams and Group Project
5.2	Apply key principles of agribusiness management, marketing and finance.	Exams, Quizzes and In Class Assignment
5.3	Evaluate core business records and financial statements and other critical financial data in support of starting and running an agricultural enterprise.	Group Project, Written Assignment, In Class Assignment
5.4	Demonstrate ethical behaviors in food system business management.	In Class Assignment, Written Assignment, Quiz
6.1	Implement best management practices for the agroecological management of biotic (e.g. crop, pest, etc.) and abiotic (e.g. water, nutrients, etc.) aspects of sustainable agricultural production systems.	Lab Report, Group Project, Homework
6.2	Implement food safety best management practices to promote human health in food production.	In Class Assignment, Homework, Group Project
7.1	Adjust personal interactions according to personality type and across diverse viewpoints.	Homework, Group Project
7.2	Contribute effectively to a team's success either as the acknowledged team leader or as one of the team members.	Homework, Group Project
8.1	Construct and deliver an effective presentation with essential elements of a scientific talk.	Oral Presentation
8.2	Communicate effectively to both a technical and non-technical audience on current topics in agriculture.	Written Assignment, Oral Presentation
8.3	Effectively engage diverse perspectives in agriculture and communicate both sides of controversial issues.	Exam, Group Project, In Class Assignment
8.4	Communicate well across cultural and language differences.	Written Assignment, In Class Assignment
8.5	Apply key principles of agribusiness management, marketing and finance.	Group Project, Written Assignment, In Class Assignment

C. **Timeline for Implementing Assessment Plan:** The assessment plan implementation for the proposed major will coincide with the proposed commencement of the major in August 2020 or as soon thereafter as possible and will adhere to the CFAES Assessment Implementation Timeline described below.

CFAES Assessment Implementation Timeline: The data collection for the identified direct measures of the learning outcomes will be conducted annually. In adherence to the CFAES Academic Program Assessment Plan Revision Cycle, this program will go through a

comprehensive outcomes assessment review every six years. The college's cycle will be "off-set" by one year, to the university's Academic Program Review cycle conducted by the OSU Office of Academic Affairs. This plan links the timing of the periodic review of programmatic outcomes assessment to the six-year academic unit program review by having the review of assessment plans due the year prior to the unit program review, in this case HCS as the lead unit for this interdisciplinary major.

D. How Outcomes Information Will Be Used to Improve Student Learning and Program Effectiveness:

Assessment results will be used to determine areas of the program where student learning falls short of the expected outcomes, consistent with the use of assessment data in all majors and graduate programs in CFAES as described below. Consequently, delivery (teaching) strategies, content and assessment methods will be consistently monitored and modified as needed to improve learning. Where necessary, the sequence of courses and assignments within courses will be adapted to reinforce desired outcomes.

CFAES Assessment data use: During the first year of implementation of a new (or re-envisioned) program assessment plan, focused attention will be given to refining the measures used for assessing achievement; to assure alignment of identified assignments with outcomes. During this initial year of the plan, units may select to collect and report supporting data for half of the documented learning goals (or a minimum of three goals) within the plan. In the following year (year two), focused efforts exploring and reexamining appropriate measures for alignment with specific program learning outcomes will occur along with data collection and reporting the remainder of the program learning goals (those not addressed during the initial implementation year). During the third year of the college's comprehensive assessment plan revision cycle, in addition to collecting and reporting data for all program learning goals, academic units are encouraged to conduct faculty facilitated student, alumni, and/or stakeholder focus groups and/or surveys to aid in assessing success of learning outcomes, learning goals, and the program. For year four of the cycle, supporting data will be collected and reported for all program learning goals; upon conclusion of the academic year, units will craft and submit, to the college's Academic Affairs Committee an executive summary of findings based on the four years of Program Assessment Plan data collected. In the fifth year of the cycle units will continue collecting and reporting data for all program learning goals and will have a member of the instructional team review stated set of program learning goals to determine if modifications should be made in the forthcoming rendition of the program assessment plan. During year six, data collection and reporting for all program learning goals will continue; in addition, the unit will assemble and convene a formal programmatic assessment review team, comprised of faculty, staff, students, alumni, and stakeholders, to: review the accumulated findings from the assessment review cycle; appraise the achievement and success of the program; examine alignment of program learning goals and outcomes; and produce a summary of recommendations for program modifications and enhancement. The efforts of the team's comprehensive review of the individual Program Assessment Plan in "year six" will produce a "re-envisioned" plan.

IV. Relationship to Other Programs:

- A. Related Majors and Minors:** Ohio State ATI's Sustainable Agriculture AS degree and SENR's Sustainable Agriculture minor have been taken into consideration and incorporated into the plan for this new major. ATI is proposing changes to their AS degree to align with the coursework in this proposal and create the opportunity for their students to seamlessly move on to the bachelor degree major proposed herein (these will be submitted separately by ATI faculty). The EEDS (Environment, Economy, Development and Sustainability) major shares a common goal of addressing pressing issues that relate to the three pillars of

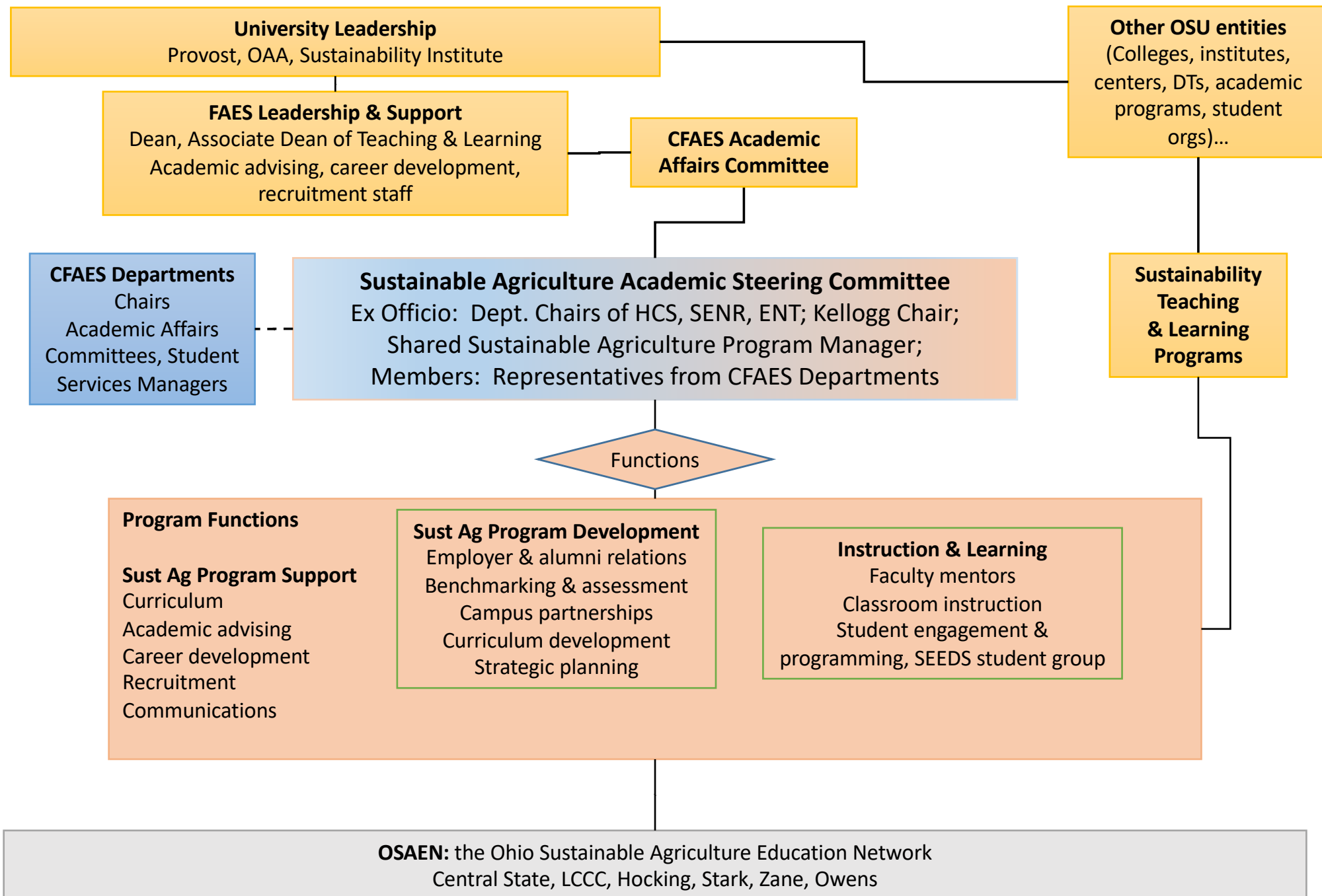
sustainability (environment, society and economy). Where the two majors differ is in the areas of focus. The EEDS major primarily focuses on environmental change, resource scarcities and growing social inequalities from a developmental perspective. The Sustainable Agriculture major focuses on the role of agricultural practice in addressing these challenges, and draws upon coursework from across CFAES.

- B. **Overlaps with Other Programs:** Currently we are planning to share a capstone course with EEDS (AEDE/ENR 4567: Assessing Sustainability: Project Experience). Additionally our students will be required to take AEDE/ENR 2500: Introduction to Environment, Economy, Development and Sustainability.
- C. **Cooperative Arrangements:** The major in Sustainable Agriculture of CFAES represents a collaborative effort supported by all of the departments in the College and faculty from other colleges as well. The administrative support for the major, however, will be provided by three academic units: Horticulture and Crop Sciences (HCS, primary), School of Environment and Natural Resources (SENR) and Entomology. Following is the administrative structure and general guidelines envisioned for managing the new major (see also the org chart figure, next page).

A Sustainable Agriculture Academic Steering Committee will govern the major, and forward requests and proposals regarding the major to the CFAES Academic Affairs Committee. The Sustainable Agriculture Academic Steering Committee will be composed of ex Officio members: Department Chairs/School Director and Academic Affairs Committee Chairs of Entomology, SENR, and HCS, and the Kellogg Chair in Agroecosystems Management; and at least five faculty members from the administering and other CFAES Departments and ATI, in each case choosing faculty members who are interested in and engaged with the major. The Sustainable Agriculture Academic Steering Committee will be the liaison for the program to the College of Food, Agricultural and Environmental Sciences Academic Affairs Committee, forwarding requests for changes, updates and other needed enhancements to the program. The participation of the Department Chairs/School Director is expected to ensure that the infrastructure and resources needed for offering the degree program are available (for example, qualified advisors, program coordination, student farm and capstone opportunities). The Committee will work with other CFAES departments to ensure that required courses are offered such that degree requirements can be met.

The committee will annually elect a chairperson from among its faculty membership. The Committee Chair may be re-elected if she/he is willing. This committee will meet at least twice per year to review required coursework and recommend adjustments in degree program structure and requirements as needed based on changes in course offerings and College or University policy. The committee will also ensure that advisors of students in the major are familiar with requirements, course sequences and career options. Because the Sustainable Agriculture Academic Steering Committee is focused on an interdepartmental major, recommendations that complement and coordinate with CFAES departmental academic affairs committees are expected to be a common aspect of its work, for example:

- Oversight, monitoring, and coordination of the sustainable agriculture teaching program, including faculty development, integration and consistency of sustainable agriculture curriculum across departments, and teaching support (equipment and facility requirements, etc.) specifically for sustainable agriculture.
- Measures and means to enhance and improve faculty development in teaching sustainable agriculture including student and peer evaluations.



- Data for assessment of program learning goals.
- Strategies and methods to enhance undergraduate recruiting, retention, student life, academic opportunities, undergraduate scholarships, communications, and advising.
- New or revised instructional programs and new or revised course offerings.
- Changes in course scheduling, course prerequisites, and programmatic credit requirements that affect students following the major.
- Petitions from students for variances in curricular requirements and reviewing grievances concerning courses, teaching performance and undergraduate advising.

D. **Arrangements with other institutions (Direct Transfer Opportunities):** As mentioned above, OSAEN is currently developing the first Transfer Assurance Guide (TAG) in agriculture, to be submitted to the Ohio Department of Higher Education as part of our work on the USDA HEC grant. Currently, agreements are being explored between OSAEN member institutions – OSU/ATI, CSU and LCCC. The establishment of a TAG could expand the number of institutions across Ohio that offer sustainable agriculture degree programs and improve the transfer opportunities into undergraduate programs at OSU.

E. **Advisory Committee:** As one of the objectives on our USDA HEC grant, we are establishing an external advisory committee that will be comprised of representatives of our institutional partners CSU and LCCC, leading farmers who are using sustainable agricultural practices, industry representatives from food and agricultural companies with a strong commitment to sustainable agriculture practices, allied NGO's, and trade organizations such as the Ohio Ecological Food and Farming Association.

F. **Recent Application for a similar major:** N/A

G. **Sources of students:** In addition to first time college students, we will draw from students at ATI and Lorain County Community College (LCCC), as well as similar programs in surrounding states and nationally, who have started or completed their Associate degree in Sustainable Agriculture or a certificate program. We have developed relationships with high school programs across the state and participate in recruiting opportunities such as the state and national FFA conventions. We observe that students from Ohio who are interested in a sustainable agriculture degree are currently going outside of Ohio for post secondary education in this area (see next section for two examples, others at <http://www.sustainableaged.org/projects/degree-programs/>). The major we propose does not exist at other land grant universities in our region, although an Agroecology Major exists at Penn State and Central State offers a Sustainable Agriculture major as noted above. We expect to draw students interested in the degree from surrounding states as well as Ohio. Finally, we note that interest in being involved in agricultural production, particularly at relatively small scales, has been growing for some time among retirees and individuals changing careers. This degree could attract a number of nontraditional students in addition to more typical recent high school graduates.

V. **Student Enrollment:**

A. As noted above, we expect a sustainable agriculture major to appeal to a wide range of students from both rural and urban backgrounds, attractive for its sustainability ethic and its entrepreneurial and employment opportunities. The Environment, Economy, Development and Sustainability (EEDS) major at OSU had 100 students by the end of its second year. Student enrollment in sustainable agriculture degree programs at other universities have had similar numbers. Both UC Davis and UMass Amherst offer majors that are similar to the one

we are proposing. UC Davis had 30 first-year students enrolled in the program's inaugural year of 2012. Since then their enrollment has gone up and is now stable at 90 – 110 students. The University of Massachusetts Amherst established a sustainable agriculture degree in 2006 enrolling 27 students. By 2016 their enrollment had grown to 140 students. Our research indicates interest in this degree program in Ohio and we expect a pattern of enrollment similar to EEDS, UC Davis, and UMass.

- B. Estimated Summer Enrollments:** We do not anticipate summer enrollments initially. Once the program is established, we may have students choosing to complete their internship in the summer. A practical farm experience course could also be offered in all three semesters, meaning that students could choose to enroll in this course during summer.

VII. Requirements:

- A. Course Composition of the Proposed Major:** The proposed curriculum is primarily composed of existing courses contributed from each of the departments in CFAES. Students will have the opportunity to explore coursework beyond CFAES through electives and their choice of a minor. The development of this proposed new major was completed by an interdisciplinary team from across the university, with strong support for encouraging students to explore learning opportunities both within and beyond CFAES.

In addition to the existing course offerings, we have developed two new courses designed to introduce sustainable agriculture, and to provide hands-on skills and use of student learning and experiences. We suggest that Waterman Farm should play a critical role in the major. The Student Farm at Waterman is proposed to serve as the primary hands on learning location for both a course providing practical experience, which students will complete twice, and the capstone for which students can use the farm as an inspiration for an entrepreneurial project.

Because this is an interdisciplinary degree, faculty from across CFAES will serve as advisors to students in the major. Administration of the major will be a joint effort between HCS, SENR, and Entomology. These departments will work together to provide staff resources, coordinate a faculty committee to assign faculty advisors for students entering the major through consultation with departments that provide the best fit for students' specific interests. A detailed description of proposed course requirements follows:

Course #	Course Title	Credit Hours	Prerequisites	GE	Course Description
CHEM 1110	Elementary Chemistry	5	Prereq: Math 1073, 1074, 1075 or above; Math Placement Level L, M, N, or R; or ACT Math subscore of 22 or higher that is less than 2 years old	Physical Science	Introductory chemistry for non-science majors, including dimensional analysis, atomic structure, bonding, chemical reactions, states of matter, solutions, chemical equilibrium, acids and bases, along with topics in organic and biological chemistry
OR					
CHEM 1210	General Chemistry I	5	Prereq: One unit of high school chemistry, and Math Placement Level L or M; or a grade of C- or above in Math 1130, 1131, 1148, 1150 or above	Physical Science	First course for science majors, covering dimensional analysis, atomic structure, the mole, stoichiometry, chemical reactions, thermochemistry, electron configuration, bonding, molecular structure, gases, liquids, and solids
BIO 1114	Biological Sciences: Form, Function, Diversity and Ecology	4	Prereq: Math 1130, 1148, or 1150 or above, or Math Placement Level L or M. Prereq or concur: Chem 1110, 1210, 1610, or 1910H or permission of course coordinator	Natural Science	Exploration of biology and biological principles; evolution and speciation, diversity in structure, function, behavior, and ecology among prokaryotes and eukaryotes. A broad introduction to biology comprises both Biology 1113 and 1114.
SOCIOL 1101	Introductory Sociology	3	No Prereq	Social Science	Fundamental concepts of sociology and introduction to the analysis of social problems and interactions (e.g. wealth, gender, race, inequality, family, crime) using sociological theories.
OR					
RURLSOC 1500	Introduction to Rural Sociology	3	No Prereq	Social Science	Principles of society, major social institutions, and social change; emphasizes social changes in rural life, rural organizations, population, and family living
MATH 1130	College Algebra for Business	4	Prereq: A grade of C- or above in 1075, or credit for 104, or Math	Math	Algebraic, exponential, and logarithmic functions. Matrix algebra. Applications to business

			Placement Level M or N, or ACT math subscore of 22 or higher that is less than 2 years old		
MATH 1148	College Algebra	4	Prereq: A grade of C- or above in 1075, or credit for 104 or 148, or Math Placement Level N, or ACT math subscore of 22 or higher that is less than 2 years old, or permission of department	Math	Functions: polynomial, rational, radical, exponential, and logarithmic. Introduction to right-angle trigonometry. Applications
OR					
MATH 1150	Precalculus	5	Prereq: Math Placement Level M	Math	Functions: polynomial, rational, radical, exponential, logarithmic, trigonometric, and inverse trigonometric. Application
AEDECON 2001	Principles of Food and Resource Economics	3	No Prereq	Social Science	Microeconomic principles applied to allocation issues in the production, distribution, and consumption of food and natural resource use
OR					
ECON 2001	Principles of Microeconomics	3	No Prereq	Social Science	Introduction to economic theory: supply and demand for goods, services, and factor inputs; market structure; international trade, the distribution of income
HCS 2201	Ecology of Managed Plant Systems	4	No Prereq	Natural Science Biology	Origin, diversification, and biogeography of plants inhabiting managed landscapes.
OR					
HCS 2202	Form and Function in Cultivated Plants	4	No Prereq	Natural Science Biology	An introduction to plant growth and development with special emphasis on structure function relationships important to productivity and quality in cultivated plants.

ENR/AEDE 2500	Introduction to Environment, Economy, Development and Sustainability	3	Prereq: Soph standing, or permission of instructor.		Introduces students to principles from various disciplines related to social, economic and environmental sustainability. Students will evaluate key concepts and examine tradeoffs that are a part of sustainability action using case studies representing diverse perspectives.
ENR 3000	Soil Science	3	No Prereq	Natural Science	Introduction to soil physical, chemical, and biological properties related to land use, environmental quality, and crop production.
ENR 3001	Soil Science Laboratory	1	Prereq or concur: 3000		Observation and quantitative determination of soil properties.
ENR 3500	Community, Environment and Development	3	Prereq: 2300 - RurlSoc 1500, or Sociol 1101		Social change related to natural resource and environmental issues. Includes a focus on community-level initiatives, environmental social movements, and issues of environmental justice
AEDE 3104	Farm Business Management	3	Prereq: 3101		Analysis of resource control and detailed application of economic and management principles to the organization, operation, and administration of farm businesses.
OR					
AEDE 4100	Self-employment and Entrepreneurship in the Food, Agriculture, and Resource Sectors	3	Prereq: AEDE 2001 or Econ 2001		This course analyzes self-employment patterns in the food, agricultural, and resource sectors and considers the role of entrepreneurship in forming and reshaping business and social enterprises in these sectors.
ANIMSCI 3600	Global Food and Agriculture	3	No Prereq		The integration of food, agriculture, environment, resources, technology, culture, and trade on a global scale.
OR					

AEDE 2580	Feast or Famine: The Global Business of Food	3	No Prereq	Social Science	Global and regional trends in food consumption and production are surveyed. Trade, technological change, and other responses to food scarcity are analyzed.
OR					
AEDE 4597.01	Food, Population and the Environment	3	Prereq: Jr or Sr standing		Issues related to world-wide population increases, food production, and associated environmental stress; policy options for lessening these concerns, especially in low-income countries.
ENR 5600	Sustainable Agriculture and Food Systems	3	Prereq: 3000 and 3500		Integrative look at the social, economic, and production/environmental dimensions of sustainable agriculture and food systems. Particular attention to sociological, soil science and related disciplinary perspectives.
HCS 5602	Ecology of Agriculture	3	Prereq: ENR 3000, and 6 sem cr hrs of HCS taken at the 3000-level or above		Examines the key ecological and evolutionary processes at work in agricultural systems and the ways those processes interact with human systems.
AEDE/ENR 4567	Assessing Sustainability: Project Experience (Capstone)	3	Prereq: Sr standing, or permission of instructor		Students gain experience in sustainability assessment by applying concepts and quantitative methods to evaluate environmental, economic, social, & technical sustainability of specific projects. EEDS major capstone.
3191/ 4191	Internship	2	Permission of Instructor/Dept. specific prereq.		
New Courses for the Major - Required					
ENR 3100	Introduction to Sustainable Agriculture	3	No Prereq		Introduction to sustainable agriculture concepts.
HCS 2307	Farm based Practical experience (taken twice)	4	No Prereq		Hands-on skills training to gain practical skills and provide a basis for classroom instruction
Choose One					

ENTMLGY 4601	General Insect Pest Management	2	Prereq: 1101, 1111, 3000, 4000, or 4600		Exploration of insect pests that affect crops, landscapes, public health, and domestic animals, and the biological, cultural, and chemical tactics used to manage them.
PLNTPTH 3001	General Plant Pathology Lecture	3	Prereq: Biology 1101, 1113, 1115H, or Entmlgy 1101		An introduction to plant diseases caused by fungi, bacteria, viruses, nematodes and parasitic higher plants. Video-linked to Wooster.
HCS 5422	Biology and Management of Weeds and Invasive Plants	3	Prereq: 3100, 3200, or 3470, and Biology 1101, 1113, or 1113H		A study of weeds and invasive plant biology and ecology, and methods of vegetation management.
Choose One					
HCS 2260	Data Analysis and Interpretation for Decision Making	3	Prereq: Math 1130, 1148, 1149, 1150, 1151.01, 1151.02, or 1156.	Data Analysis	Basic concepts of probability and statistics applied to the interpretation of quantitative data.
ANIMSCI 2260	Data Analysis and Interpretation for Decision Making	3	Prereq: Math 1130, 1148, 1150, or 1151.	Data Analysis	Introduces students to the use of statistics in data analysis and interpretation. Students develop skills in quantitative literacy and logical reasoning.
ENR 2000	Natural Resources Data Analysis	3	No Prereq	Data Analysis	Introductory data analysis course that focuses on understanding and applying basic statistical concepts, problem solving, and interpreting the results of statistical analysis.
AEDE 2005	Data Analysis for Agribusiness and Applied Economics	3	Prereq: Math 1130 or 1131 or 1148 or 1150 or 1151.01 or 1151.02 or 1156.	Data Analysis	Introductory course in data analysis, stressing computer applications of probability and statistics, problems of data gathering, presentation, and interpretation in economics and business.
STAT 1450	Introduction to the Practice of Statistics	3	Prereq: Math 1116 or 1130 or above, or Math Placement Level L or M, or permission of instructor.	Data Analysis	Algebra-based introduction to data analysis, experimental design, sampling, probability, inference, and linear regression. Emphasis on applications, statistical reasoning, and data analysis using statistical software.

COMLDR 3537	Data Analysis in the Applied Sciences	3	Prereq: Math 1130 or 1148	Data Analysis	The purpose of this course is to develop an overview and basic understanding of descriptive and inferential statistics.
Choose 8 - 9 Credits from the following Production Courses:					
AGSYSMT 3550	Animal and Rural Waste Management	2	No Prereq		Management of animal wastes, wastewater and solid waste generated through agricultural practices and rural living to utilize nutrients, recover energy, reuse water, protect public health and abate environmental pollution.
ANIMSCI 2200.01	Introductory Animal Sciences	3	No Prereq	Natural Science Biology	A study of the basic principles of genetics, breeding, reproduction, nutrition, behavior, and biotechnology as it applies to the molecular, cellular, and physical underpinnings of domesticated animal form and function.
ANIMSCI 2200.02	Introductory Animal Sciences Laboratory	1	Prereq or concur: 2200.01 or 2300H, or permission of instructor	Natural Science Biology	Laboratory experience associated with basic principles of genetics, breeding, reproduction, nutrition, behavior, and biotechnology as it applies to the molecular, cellular, and physical underpinnings of domesticated animal form and function.
ANIMSCI 3100	Animal Growth and Development	3	Prereq: ANIMSCI 2200.01 or 2300H, Biology 1113 and Soph standing or above or permission of instructor		An overview of growth and development on form and function of food animals and its impact on value.
ANIMSCI 3130	Principles of Animal Nutrition	3	Prereq: ANIMSCI 2200.01 or 2300H, Biology 1113 or 1113H, and Soph standing or above or permission of instructor		A study of the nutrients, their roles and requirements, digestion and metabolism with an emphasis on domesticated animals maintained for human benefit.

ANIMSCI 3400	Management Intensive Grazing	2	No Prereq		Application of scientific principles of plant growth, animal nutrition and behavior to manage grazing systems for profitable, sustainable livestock enterprises.
ENTMLGY 4601	General Insect Pest Management (Not if taken for credit above)	2	Prereq: 1101, 1111, 3000, 4000, or 4600.		Exploration of insect pests that affect crops, landscapes, public health, and domestic animals, and the biological, cultural, and chemical tactics used to manage them.
FDSCTE 2400	Introduction to Food Processing	3	Biology 1101 or 1113, and Chem 1110 or 1210		Introductory class applying chemistry, biology, and engineering to hands-on experience on the production and evaluation of foods. Includes basic food regulations, sanitation and formulation.
FDSCTE 4410	Hazard Analysis and Critical Control Points	2	Prereq: 2400		Teaches the basics of HACCP. Upon completion of the course, students will understand the relationship of GMPs (Good Manufacturing Practices), SSOPs (Sanitation Standard Operating Procedures), pre-HACCP steps and the Seven Principles of HACCP. The students will select a food processing operation and develop a HACCP plan
HCS 2201	Ecology of Managed Plant Systems (Not if taken for credit above)	4	No Prereq	Natural Science Biology	Origin, diversification, and biogeography of plants inhabiting managed landscapes.
HCS 2202	Form and Function in Cultivated Plants (Not if taken for credit above)	4	No Prereq	Natural Science Biology	An introduction to plant growth and development with special emphasis on structure function relationships important to productivity and quality in cultivated plants.
HCS 2305	Organic Gardening	1	No Prereq		An overview and assessment of organic gardening practices for sustenance and recreation.

HCS 3100	Introduction to Agronomy	3	No Prereq		An introductory course of row crop and forage agricultural production (agronomy). This course introduces students to row and forage crop species common in Ohio and surrounding states, and provides fundamental information on how these crops are managed in the region. Management aspects include site preparation, seasonality of management activities, and fundamentals of nutrient and pest management.
HCS 3220	Crop Origins and Diversity	2	No Prereq		A survey of plant taxonomy including principles of nomenclature and classification. Students will learn important botanical characteristics of major plant families. Course emphasis is on plant taxa of economic importance in horticulture and agricultural production.
HCS 3310	Crop Responses to the Environment	3	Prereq: 2202 or 2202E, and Biology 1113 or 1113H.		The physiological basis of crop responses to abiotic and biotic environmental factors.
HCS 5422	Biology and Management of Weeds and Invasive Plants (Not if taken for credit above)	3	Prereq: 3100, 3200, or 3470, and Biology 1101, 1113, or 1113H		A study of weeds and invasive plant biology and ecology, and methods of vegetation management.
HCS 5450	Vegetable Crop Production and Physiology	3	Prereq: 2200, 2201, 2202, 300 or MolGen 3300; and Chem 1110 or 1210; and Biology 1101, 1113, or MolGen 1101		A physiological and ecological study of the principal vegetable crop species grown for processing and fresh market use. The impacts of integrated crop management and other production systems on vegetable yields and quality are also considered.

PLNTPTH 3001	General Plant Pathology Lecture (Not if taken for credit above)	3	Prereq: Biology 1101, 1113, 1115H, or Entmlgy 1101		An introduction to plant diseases caused by fungi, bacteria, viruses, nematodes and parasitic higher plants. Video-linked to Wooster.
PLNTPTH 5140	Diseases of Field Crops	2	Prereq: 2 courses in Biological Sciences or permission from instructor		Key diseases that impact crop plants with emphasis on identification, management and field evaluations of management strategies.

B. Minimum Number of Credits Required for Graduation: 121

C. Average number of credits expected for students at graduation: 121

D. Average credits per year:

	Year 1	Year 2	Year 3	Year 4
Full-time	34	32	29	26

E. Required credits taken in other departments: This is an interdisciplinary degree that will be co-administered by Horticulture and Crop Science, Entomology and the School of Environment and Natural Resources. The nature of this degree requires students to take coursework throughout CFAES schools and departments (see course plan, page 24).

Department	# of Credits	Level

F. Electives in other departments: See section E, above.

Department	# of Credits	Level

G. Other major requirements: An internship and completion of a minor (or minor equivalent) is a CFAES requirement.

H. Accreditation: N/A

I. Faculty

1. Current – following is a list of faculty members who are either coPIs on the USDA Higher Education Challenge grant or interested faculty who have contributed time and effort to the proposal for this new major.

Name	Area of Expertise	Full/Part time
Carol Anelli	Entomology, CFAES	FT
Dave Barker	Pasture and grazing, CFAES	FT
Jake Boswell	Landscape Architecture, Knowlton School	FT
Jill Clark	Policy, John Glenn College of Public Affairs	FT
Steve Culman	Soil Science, SENR, CFAES	FT
Matt Davies	Natural Resources, SENR, CFAES	FT
Mary Gardiner	Entomology, CFAES	FT
Ryan Haden	Soil Science, Agricultural Technical Institute, CFAES	FT
Dennis Heldman	Food Science and Technology, CFAES	FT
Greg Hitzhusen	Sustainability, SENR, CFAES	FT
Casey Hoy	Agroecosystems management, CFAES	FT
Matt Kleinhenz	Horticulture, CFAES	FT
Subramanian Kumarappan	Business, Agricultural Technical Institute, CFAES	FT
Monica Lewandowski	Plant Pathology, CFAES	FT
Forbes Lipschitz	Landscape design, Knowlton School of Architecture	FT
Jay Martin	Engineering, FABE, CFAES	FT
Kristin Mercer	Crop Science and student farm pedagogy, Horticulture and Crop Science, CFAES	FT
Michael Mercil	Art, College of Arts and Sciences	FT
Jim Metzger	Horticulture and Crop Science, CFAES	FT
Tony Parker	Animal Sciences, CFAES	FT
Emilie Regnier	Crop ecology, Horticulture and Crop Science, CFAES	FT
Mary Rodriguez	Communication, ACEL, CFAES	FT
Brian Roe	Economics, AEDE, CFAES	FT
Jeff Sharp	School of Environment and Natural Resources, CFAES	FT
Brian Slater	School of Environment and Natural Resources, CFAES	FT

2. Proposed Additional Faculty
NA.

Name	Area of Expertise	Full/Part time

J. Existing facilities, equipment and off-campus field experience and clinical sites used: The program will require consistent use of student farm land, facilities and instruction at Waterman farm. The practical experience and capstone courses in particular will be expected to make frequent use of these facilities for hands-on learning and entrepreneurial farm-based projects. The student farm has been in operation with varying levels of activity for over 10 years. Therefore, we do not anticipate any new land resources to be needed by the program. Additional or more consistent programmatic resources associated with student farm production will likely be required as enrollment increases, and these are covered in the next section.

K. Additional University resources required: In addition to farm resources at the Waterman Farm as described above for the student farm, the students will need tools and supplies, equipment and machinery, irrigation, and production facilities to extend the season such as a high tunnel, to

accomplish experiential learning goals. Farm management will be needed to coordinate hands on student learning opportunities, and could be provided either by re-assigning current staff or adding staff to manage student farming activities. Academic program coordination will require staff time, similar to the program coordination performed in EEDS.

L. College bulletin listing:

Sustainable agriculture is about managing a farm as part of an integrated system, including plants, animals, soils, people and economies. The sustainable agriculture major will provide students with an interdisciplinary and holistic lens for thinking about farming, balancing its environmental, social and economic dimensions, from management of the farm itself to its relationship with the surrounding landscape and neighboring communities. This program is rooted in interdisciplinary coursework, hands-on farming experiences, and developing key employer-requested skills like systems thinking, teamwork and leadership. Students pursuing the program will not only learn about agricultural practice but will graduate with valuable transferable skills in systems thinking, problem solving, written and verbal communication, management, collaboration and entrepreneurship. It will teach students to think critically about environmental sustainability, human-environmental interactions, and our changing food system, preparing them to perform in and create cutting edge jobs in the 21st century economy.



All students must complete two Global Issues courses (▲). All students must take a Social Diversity requirement in the GE which can be done by completing Rural Sociology 1500 or Sociology 1101.

FAES 1100 and Dept. 1100	.5,.5	Social Science 2 (AEDECON 2001 or ECON 2001)	3
Writing Level 1 (English 1110)	3	Historical Study See approved CFAES GE list	3
Writing Level 2 (ENR 2367) See approved CFAES GE list	3	Culture & Ideas or Historical Study See approved CFAES GE list	3
Agr Comm 3130	3	Literature See approved CFAES GE list	3
Math (MATH 1130 or 1148 or 1150)	4-5	Art See approved CFAES GE list	3
Data Analysis (Choose One)	3	Contemporary Issues See approved CFAES GE list	3
HCS 2260, ANIMSCI 2260, ENR 2000		Internship (x191, 2 cr; and FAES 3191, 0 cr)	2
AEDE 2005, STAT 1450 or COMLDR 3537		Total GE Credit Hours	57-58
Biological Science (BIO 1114)	4	Major	39
Physical Science (CHEM 1110 or 1210)	5	Minor*	12 – 16
Additional Science (ENR 3000 & 3001)	4	Electives	8 – 13
Additional Science (HCS 2201 or 2202)	4	Total	121
Social Science 1 (RS 1500 or SOCIOL 1101)	3		

Major Requirements

ENR/AEDE	2500	Introduction to Environment, Economy, Development and Sustainability	3
AEDE	3104	Farm Business Management	3
Or AEDE	4100	Self-employment and Entrepreneurship in the Food, Agriculture, and Resource Sectors	
ENR	3500**	Community, Environment & Development	3
ANIMSCI	3600	Global Food and Agriculture	3
Or AEDE	2580	Feast or Famine: The Global Business of Food	
Or AEDE	4597.01	Food, Population and the Environment	
ENR	5600	Sustainable Agriculture and Food Systems	3
HCS	5602	Ecology of Agriculture	3
ENTMLGY	4601	General Insect Pest Management (2 Credits)	2 - 3
Or PLNTPTH	3001	General Plant Pathology (3 Credits)	
Or HCS	5422	Biology & Management of Weeds & Invasive Plants (3 Credits)	
ENR	3100	Introduction to Sustainable Agriculture	3
HCS	2307	Farm-Based Practical Experience (taken twice)	4
AEDE/ENR	4567	Assessing Sustainability: Project Experience (Capstone)	3

Choose 8 - 9 Production Credits***

AGSYSMT	3550	Animal and Rural Waste Management	2
ANIMSCI	2200.01	Introductory Animal Sciences	3
ANIMSCI	2200.02	Introductory Animal Sciences Lab	1
ANIMSCI	3100	Animal Growth and Development	3
ANIMSCI	3130	Principles of Animal Nutrition	3
ANIMSCI	3400	Management Intensive Grazing	2
ENTMLGY	4601	General Insect Pest Management (If not taken for credit above)	2
FDSCTE	2400	Introduction to Food Processing	3
FDSCTE	4410	Hazard Analysis and Critical Control Points	2
HCS	2201	Ecology of Managed Plant Systems (If not taken for credit above)	4
HCS	2202	Form and Function in Cultivated Plants (If not taken for credit above)	4
HCS	2305	Organic Gardening	1
HCS	3100	Introduction to Agronomy	3
HCS	3220	Crop Origins and Diversity	2
HCS	3310	Crop Responses to the Environment	3
HCS	5422	Biology & Management of Weeds & Invasive Plants (If not taken for credit above)	3
HCS	5450	Vegetable Crop Production and Physiology	3
PLNTPTH	3001	General Plant Pathology (If not taken for credit above)	3
PLNTPTH	5140	Diseases of Field Crops	2

* = Students are not eligible to enroll in the Sustainable Agriculture Minor ** = Prerequisite for a core course

*** = Some of the courses among the options have prerequisites

Sustainable Agriculture Major Course Plan

* = Prerequisite for a core course

Course #	Course Title	Credit
1st Year Autumn Semester		
CFAES 1100	College Orientation	.5
Dept. 1100	Department Seminar	.5
ENGLISH 1110	Writing Level I	3
MATH 1130	College Algebra for Business	4-5
OR MATH 1148	College Algebra	
OR MATH 1150	Precalculus	
HCS 2307	1 st Practical experience	2
GE	History, Literature or Art	6
		16-17

2nd Year Autumn Semester		
ENR 3000	Intro to Soil Science	3
ENR 3001	Intro to Soil Science Lab	1
AGRCOMM 3130	Oral Expression in Agriculture	3
RS 1500*	Intro to Rural Sociology	3
OR SOCIOL 1101	Intro to Sociology	3
ENR 3100	Intro to Sustainable Ag	3
HCS 2307	2 nd Practical experience	2
		15

3rd Year Autumn Semester		
ENR/AEDE 2500	Intro to Environment, Economy, Development & Sustainability	3
ENTMLGY 4601	General Insect Pest Management	2 -3
OR PLNTPTH 3001	General Plant Pathology Lecture	
OR HCS 5422	Biology & Management of Weeds & Invasive Plants	
3191/x191	Internship**	2
GE	Cultures and Ideas or Historical Study	3
	Minor/Elective/Production	4 - 5
		15

4th Year Autumn Semester		
ENR 5600	Sustainable Agriculture & Food Systems	3
	Minor/Elective/Production	3
GE (4597)	Contemporary Issues	3
	Production/Minor/Elective	6
		15

Course #	Course Title	Credit
1st Year Spring Semester		
CHEM 1110	Elementary Chemistry (w/lab)	5
OR CHEM 1210	General Chemistry I (w/lab)	
AEDE 2001*	Principles of Food & Resource Economics	3
OR ECON 2001	Principles of Microeconomics	3
GE	History, Literature or Art	3
Data Analysis	(HCS 2260, ANIMSCI 2260, ENR 2000, AEDE 2005, STAT 1450 or COMLDR 3537)	3
	Minor/Production/Elective	3
		17

2nd Year Spring Semester		
BIO 1114	Biological Sciences: Form, Function, Diversity & Ecology (w/lab)	4
ENR 2367	Communicating Environmental & Natural Resources Info	3
ENR 3500*	Community, Environment & Development	3
HCS 2201	Ecology of Managed Plant Systems	4
OR HCS 2202	Form & Function in Cultivated Plants	4
	Minor/Production/Elective	3
		17

3rd Year Spring Semester		
ANIMSCI 3600	Global Food & Agriculture	3
OR AEDE 2580	Feast or Famine: The Global Business of Food	
OR AEDE 4597.01	Food, Population & the Environment	
AEDE 3104	Farm Business Management Self-Employment &	3
OR AEDE 4100	Entrepreneurship in the Food, Agriculture & Resource Sectors	
	Minor/Production/Elective	8
		14

4th Year Spring Semester		
AEDE/ENR 4567	Assessing Sustainability: Project Experience	3
HCS 5602	Ecology of Agriculture	3
	Minor/Production/Elective	6
		12

** = Must enroll in FAES 3191 (0 cr) while on-site for internship

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Attachments:

Budget

Letter of Support from the Sustainability Institute Director, Elena Irwin

Letter of Support from CFAES Chairs at the time of the proposal

Emails of support for the proposed Sustainable Agriculture Major from CFAES Curriculum committees

Sustainable Agriculture Major Budget figures under the following assumptions:

The program grows to 100 students by year 5, starting with 20 students in year 1 and adding 20 students each subsequent year.

The program attracts 50 new students by year 5, that is of the 100 students in the program, 50 would have been in the College already and are opting for this major while 50 students come new to CFAES (via Inter-university transfer, transfer, and new first year students).

Each student in the major will take an average of 17 credit hours within CFAES. We also estimate each credit hour generates state subsidy at the STEM 2 level (which is a conservative estimate given many of the advanced courses in the College are STEM 4).

Because the University allocation of funds to Colleges is based on a two year average, the actual gain described below may be delayed in getting to CFAES.

	New credit hours to College	Est. net to College	Est. net to academic units (net to the college minus college tax of 17%)
Year 1	170	\$ 51,220	\$ 42,513
Year 2	340	\$ 102,441	\$ 85,026
Year 3	510	\$ 153,662	\$ 127,540
Year 4	680	\$ 204,883	\$ 170,053
Year 5	850	\$256,104	\$212,566

Note that required resources are described in section VII K above, and that the income estimated above would be sufficient to meet program costs within the first few years of the major.



THE OHIO STATE UNIVERSITY

SUSTAINABILITY INSTITUTE

Sustainability Institute

The Ohio State University
3018 Smith Lab
174 W. 18th Ave.
Columbus, OH 43123

614-247-4762 Phone
614-247-4257 Fax

si.osu.edu

February 6, 2020

Professor Casey Hoy
Agroecosystems Management Program
Dept. of Entomology
CFAES

Dear Casey:

I am writing to offer the concurrence with and support of the Sustainability Institute (SI) for the proposed new major in Sustainable Agriculture in CFAES. Through the work of the SI-led Sustainability Education and Learning Committee (SELC), we analyzed opportunities across the University for new curriculum in the area of sustainability and compared it to student demand by administering a sustainability education survey to all undergraduate students. Sustainable agriculture was one of the key opportunities that we identified and your proposal does an excellent job of filling that gap. The interdisciplinary approach you've taken, involving all of CFAES and including faculty from other colleges in the development of the proposal, is exactly what we would hope to see.

Your proposal for the Sustainable Agriculture major also aligns well with the SELC six dimensions of sustainability framework, which classifies programs and courses by highlighting the multi-faceted nature of sustainability education. We'll look forward to collaborating with you and the faculty and staff engaged with the new major.

Sincerely,

Elena Irwin
Faculty Director, Sustainability Institute
Distinguished Professor of Food, Agricultural, and Environmental Sciences in Economics & Sustainability
Ohio State University



College of Food, Agricultural, and Environmental Sciences

2120 Fyffe Rd., 100 Ag Administration Building
Columbus, OH 43210
(614) 292-6891
www.cfaes.osu.edu

March 10, 2015

Dr. Casey Hoy
Professor and Kellogg Endowed Chair in Agricultural Ecosystems Management
The Ohio State University
Ohio Agricultural Research and Development Center
Ohio State University Extension
1680 Madison Ave.
Wooster, Ohio 44691

Dear Casey,

The department chairs and school directors of The Ohio State University College of Food, Agricultural and Environmental Sciences (CFAES) are pleased to offer our support for your USDA Higher Education Challenge proposal, *A Statewide Network for Multiple Pathways to a Baccalaureate Degree in Sustainable Agriculture*. We appreciate the proactive manner in which you are engaging the full breadth of CFAES academic programs in the project's development and execution, and are pleased to have so many faculty and partner institutions involved. We recognize the importance of integrated efforts focused on sustainable agriculture, and are particularly supportive of the apprenticeship, certificate, and associate degree pathway to the baccalaureate degree upon which the proposed program is based. The interdepartmental and multi-institutional nature of the proposal is a particular strength, as are the focus on systems-oriented problem solving and the farm-based experiences.

Creating and implementing new baccalaureate programs is a formidable task, but we believe that the proposed degree has considerable merit, and look forward to working with you and the partner institutions to bring it to fruition.

Sincerely,

A handwritten signature in black ink that reads 'Sheryl Barringer'.

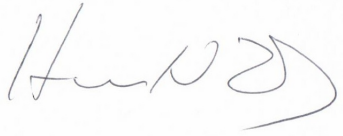
Sheryl Barringer, Chair
Department of Food Science and Technology

A handwritten signature in black ink that reads 'Tim Haab'.

Tim Haab, Chair
Department of Agricultural, Environmental and Developmental Economics



Dan Herms, Chair
Department of Entomology



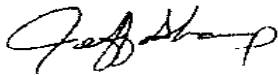
Henry Zerby, Chair
Department of Animal Sciences



Jeff LeJeune, Head
Food Animal Health Research Program



Ken Martin, Chair
Department of Extension



Jeff Sharp, Director
School of Environment and Natural Resources



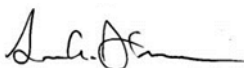
Gary Straquadine, Chair
Department of Agricultural Communication, Education and Leadership



Terry Niblack, Chair
Department of Plant Pathology



James D. Metzger, Chair
Department of Horticulture and Crop Sciences



Scott A. Shearer, Chair
Department of Food, Agricultural and Biological Engineering

Emails of support for the proposed Sustainable Agriculture Major from CFAES Curriculum committees:

Agricultural Communication, Education, and Leadership

From: "Rodriguez, Mary T." <rodriguez.746@osu.edu>
Date: Monday, January 6, 2020 at 4:51 PM
To: Casey <hoy.1@osu.edu>
Subject: Re: Proposal for a new major in Sustainable Agriculture

Hi Casey,
Great to hear from you. ACEL supports the new major in Sustainable Agriculture.
Happy New Year by the way!

In community,
Mary Rodriguez

Agricultural, Environmental and Development Economics

From: Brian Roe <roe.30@osu.edu>
Date: Monday, September 16, 2019 at 7:29 PM
To: Casey <hoy.1@osu.edu>
Subject: RE: Proposal for a new major in Sustainable Agriculture

AEDE provides its support.

Brian

Brian E. Roe
VanBuren Professor and Undergraduate Program Leader
Agricultural, Environmental and Development Economics
Leader, [Ohio State Food Waste Collaborative](#)
Ohio State University

Animal Sciences

From: Maurice Eastridge <eastridge.1@osu.edu>
Date: Thursday, September 5, 2019 at 5:19 PM
To: Casey <hoy.1@osu.edu>
Cc: "Foltz, John C." <foltz.75@osu.edu>, "Parker, Anthony J." <parker.1203@osu.edu>
Subject: RE: Proposal for a New Major in Sustainable Agriculture

Casey:

We appreciate your sharing this information with us regarding the proposed new major titled "Sustainable Agriculture". We hereby extend support for this new major and appreciate the opportunity for being included in its offering. A few suggestions regarding content within the document provided are:

1. Page 6, Goal G: I assume that it should read "Understand team dynamics and how to be an effective team member **or** leader."
2. Page 11: a) The credit hours for ANIMSCI 2200.01 (3 cr hr) and 2200.02 (1 cr hr) totals 4 cr hr, not the 3 cr hr you have listed. The prerequisite for this course is: GE Nat Sci Bio Course, b) the prerequisite for ANIMSCI 3100 is: ANIMSCI 2200.01 or 2300H, and Biology 1113, and Soph standing or above, and c) the prerequisite for ANIMSCI 3130 is: ANIMSCI 2200.01, 2300H, Biology 1113 or 1113H, and Soph standing or above.
3. Page 19: Both "ANIMSCI 2200.01 and 2200.02" should be listed for the 4 cr hr shown.

Let me know if you have any questions about these comments.

Thanks,

Maurice



Dr. Maurice L. Eastridge
Professor and Associate Chair, Department of Animal Sciences
The Ohio State University
2029 Fyffe Court
221B Animal Science Building
Columbus, OH 43210
614-688-3059
614-292-1515 FAX

Entomology

From: Celeste Welty <welty.1@osu.edu>
Date: Friday, October 18, 2019 at 2:05 PM
To: Casey <hoy.1@osu.edu>
Subject: Re: Proposal for a new major in Sustainable Agriculture

Casey: yesterday our entomology curriculum committee met. In advance, members were provided with the 24-page draft of the proposed new major. We discussed it, and voted to support the proposal: 6 votes for, 0 votes against, and no abstentions.

Our only 2 suggestions are:

p. 10, internship course, add ENTMLGY and HCS options in addition to the ENR option (as mentioned in my previous message)

p. 11, production courses: ENTMLGY 2200, Beekeeping, would be a good addition to the list.

Let us know if you need additional feedback as this proposal continues to develop.

sincerely,

Celeste

(chair of entomology curriculum committee)

Celeste Welty, Ph.D.
Extension Entomologist
& Associate Professor of Entomology
Ohio State University
Rothenbuhler Lab
2501 Carmack Road
Columbus OH 43210-1065
Office Phone: 614-292-2803
Office Fax: 614-292-9783
Mobile Phone: 614-746-2429
E-mail: welty.1@osu.edu

Food, Agricultural and Biological Engineering

From: Gonul Kaletunc <kaletunc.1@osu.edu>

Date: Tuesday, January 28, 2020 at 3:16 PM

To: Casey <hoy.1@osu.edu>

Cc: Gonul Kaletunc <kaletunc.1@osu.edu>

Subject: Re: Proposal for a new major in Sustainable Agriculture

Hi Casey,

I forgot to mention in my previous email that FABE is supportive of "Sustainable Agriculture" major.

Best regards,

Gonul



Gönül Z. Kaletunc, Ph.D.

Professor of Food Engineering
Director, Faculty Professional Development Program

College of Engineering

Academic Affairs Committee Chair

Department of Food, Agricultural and Biological Engineering

[590 Woody Hayes Dr., Columbus, OH 43210](#)

614-292-0419 Office

kaletunc.1@osu.edu

Food Science and Technology

From: Luis Rodriguez-Saona <rodriguez-saona.1@osu.edu>

Date: Sunday, February 9, 2020 at 6:10 PM

To: Casey <hoy.1@osu.edu>

Cc: "Heldman, Dennis R." <heldman.20@osu.edu>, Sheryl Barringer <barringer.11@osu.edu>

Subject: Concurrence for the new major on Sustainable Agriculture

Dear Casey:

The Department of Food Science and Technology Academic Affairs Committee has reviewed the proposal for the new major on Sustainable Agriculture to be offered by the College of Food, Agriculture and Environmental Science. The proposal for this new major presents a long list of goals and outcomes, and the specific courses to be completed by students to meet the requirements of the major. Faculty of the FST Academic Affairs Committee have expressed concerns about the overall lack of course content on food safety. More specifically, the proposal lacks course content needed to deliver on the outcome stated as "Implement food safety best management practices to promote human health in food production". Members of the FST Academic Affairs Committee recognize that the current list of core courses in the proposed major has been developed to meet the goals and outcomes of the major within a defined and limited number of courses and credit hours.

During our conversation on Feb 5, you indicated that food safety outcomes in the proposed major are to be addressed within the content of a 4-credit practical experience with production course (HCS 2307). In this course, students are expected to produce food, primarily fruit and vegetables at least at the outset, while implementing and being assessed on their use of the practices. Although the proposed content of HCS 2307 contains some aspects of food safety (see below), the FST Academic Affairs Committee recommends the addition of lectures and related content presented by a faculty member from Food Science and Technology. In addition, the committee recommends the addition of FDSCTE 2400 and HACCP (FDSCTE 4410) to a list of electives available to students pursuing the proposed major. The content of these courses would be critical for students considering on-farm processing (ie. cheese, preserves) as a sustainable alternative.

If the recommendations being offered by the Department of Food Science and Technology Academic Affairs Committee are acceptable to you, the Department can support approval of the Sustainable Agriculture major by CFAES.

Best Regards,

Luis

Luis E. Rodriguez-Saona

Professor

College of Food, Agricultural, and Environmental Sciences

Department of Food Science and Technology

2015 Fyffe Road, Columbus, OH 43210

Office: 614-292-3339; e-mail: rodriguez-saona.1@osu.edu

Horticulture and Crop Sciences

From: S Harrison <harrison.9@osu.edu>
Date: Thursday, August 29, 2019 at 12:34 PM
To: Casey <hoy.1@osu.edu>
Cc: James Metzger <metzger.72@osu.edu>
Subject: Re: Proposal for a new major in Sustainable Agriculture

Hi Casey,

The HCS committee on academic affairs committee supports the proposed new major in Sustainable Agriculture.

Just one comment: As you're probably aware, the proposed new courses HCS XXX - Farm-base practicum and ENR XXX - Sust. Agri. capstone will likely require full development and approval before the major can be approved at the next level...

Kent

Kent Harrison, Professor
Department of Horticulture & Crop Science
Ohio State University
2021 Coffey Road
Columbus, OH 43210
tel. (614)292-5056
fax (614)292-7162

Plant Pathology

From: "Benitez Ponce, Soledad" <benitezponce.1@osu.edu>
Date: Friday, January 3, 2020 at 11:43 AM
To: Casey <hoy.1@osu.edu>
Subject: Re: Proposal for a new major in Sustainable Agriculture

Hi Casey,

As chair of the academic affairs committee from the Department of Plant Pathology, I want to let you know that Plant Pathology does support this new major. Let me know if you need additional information from me.

Regards,

Soledad

School of Environment and Natural Resources

From: "Brooks, Jeremy S." <brooks.719@osu.edu>

Date: Friday, August 30, 2019 at 3:18 PM

To: Casey <hoy.1@osu.edu>

Cc: "Harrison, Jennifer A." <harrison.497@osu.edu>, Jeff Sharp <sharp.123@osu.edu>, Brian Slater <slater.39@osu.edu>

Subject: Re: Proposal for a new major in Sustainable Agriculture

Hi Casey,

Our Academic Affairs Committee met today to discuss the proposed Sustainable Agriculture major. The committee was very supportive and appreciated the years of work that went into developing the proposal. There was some discussion about the timing of the roll out of the major and the implications of that for our existing Sustainable Ag specialization within our NRM major, but that is an internal matter that wouldn't affect this proposal. The only direct suggestion we had was - to the degree that it's possible - it might be useful to add some more explicit language about the potential opportunities for linking the emergence of this major with a re-envisioned Waterman Farm. Brian mentioned that this has been discussed, but it would be great to integrate it into the proposal if possible.

Other than that, folks in the committee were enthusiastic about the major and think it will benefit the College.

Best,

Jeremy

Fiscal Unit/Academic Org	Horticulture & Crop Science - D1127
Administering College/Academic Group	Food, Agric & Environ Science
Co-administering College/Academic Group	
Semester Conversion Designation	New Program/Plan
Proposed Program/Plan Name	Sustainable Agriculture
Type of Program/Plan	Undergraduate bachelors degree program or major
Program/Plan Code Abbreviation	
Proposed Degree Title	Bachelor of Science in Agriculture

Credit Hour Explanation

Program credit hour requirements		A) Number of credit hours in current program (Quarter credit hours)	B) Calculated result for 2/3rds of current (Semester credit hours)	C) Number of credit hours required for proposed program (Semester credit hours)	D) Change in credit hours
Total minimum credit hours required for completion of program				121	
Required credit hours offered by the unit	Minimum			39	
	Maximum			39	
Required credit hours offered outside of the unit	Minimum			82	
	Maximum			87	
Required prerequisite credit hours not included above	Minimum			0	
	Maximum			0	

Program Learning Goals

Note: these are required for all undergraduate degree programs and majors now, and will be required for all graduate and professional degree programs in 2012. Nonetheless, all programs are encouraged to complete these now.

Program Learning Goals

- Students will understand agricultural production systems and agroecological principles, and apply knowledge to design and enhance the sustainability of agricultural systems.
- Students will understand the social, cultural, economic and political foundations of agriculture and food systems.
- Students will apply systems thinking to sustainable agriculture and food system problems and opportunities.
- Students will understand local and global agricultural landscapes across spatial and temporal scales, using a multidisciplinary perspective.
- Students will understand and apply entrepreneurship and agribusiness principles for sustainable agriculture and food systems.
- Students will apply skills and knowledge gained towards hands-on management of sustainable agricultural systems.
- Students will understand team dynamics and how to be an effective team member or leader.
- Students will communicate effectively to a diversity of audiences using various modes and media.

Assessment

Assessment plan includes student learning goals, how those goals are evaluated, and how the information collected is used to improve student learning. An assessment plan is required for undergraduate majors and degrees. Graduate and professional degree programs are encouraged to complete this now, but will not be required to do so until 2012.

Is this a degree program (undergraduate, graduate, or professional) or major proposal? Yes

Does the degree program or major have an assessment plan on file with the university Office of Academic Affairs? Yes

Program Specializations/Sub-Plans

If you do not specify a program specialization/sub-plan it will be assumed you are submitting this program for all program specializations/sub-plans.

Pre-Major

Does this Program have a Pre-Major? No

Attachments

- CFAES Sustainable Agriculture Major Proposal 2_25_20.pdf: Program Proposal

(Program Proposal. Owner: Luikart,Meredith Marie)

- CFAES COAA Support Letter.pdf: CFAES Letter of Support

(Letter from the College to OAA. Owner: Osborne,Jeanne Marie)

Comments

Workflow Information

Status	User(s)	Date/Time	Step
Submitted	Luikart,Meredith Marie	02/26/2020 01:22 PM	Submitted for Approval
Approved	Metzger,James David	03/03/2020 01:14 PM	Unit Approval
Approved	Osborne,Jeanne Marie	03/03/2020 01:17 PM	College Approval
Pending Approval	Reed,Kathryn Marie Johnson,Jay Vinton	03/03/2020 01:17 PM	CAA Approval