

# Pennsylvania (Penn State University Park)

## Plan of Work for 2023-2027

Status: Final (Approved 9/29/2022)

### Executive Summary Overview

The College of Agricultural Sciences at Penn State will provide comprehensive support to the residents of Pennsylvania through the activities of the Pennsylvania Agricultural Experiment Station (AES) and Penn State Extension (Extension). We will be responsive to stakeholder needs through translational research and delivery of science-based programs to clientele, but we will also conduct internationally relevant fundamental research that generates baseline data to solve future needs relative to agriculture and natural resources and actively seek new and better ways to communicate our programs to new audiences. Our faculty and staff, supported by federal base funding, will effectively leverage this investment against many other external funding sources to conduct programs of the highest caliber. We are committed to excellence in research, educating the next generation of agricultural professionals and citizens, and promoting life-long learning among the citizens of Pennsylvania.

Our College mission is clear: "The mission of the College of Agricultural Sciences is to discover, integrate, translate, and disseminate knowledge to enhance the food and agricultural system, natural resources and environmental stewardship, and economic and social well-being, thereby improving the lives of people in Pennsylvania, the nation, and the world."

#### Evolving outlook on the future of agriculture

Agriculture faces challenges of rising energy costs, weather extremes, an expanding human population, environmental degradation, loss of biodiversity, labor shortages, armed conflict, and a lingering pandemic. To help meet these challenges, we are developing a conceptual framework based on the science of agricultural sustainability--defined as the integration of natural and social sciences to inform practice and policy for productive, working landscapes, healthy watersheds, and resilient economies. This innovative approach to agricultural research, engagement, and education centers on the impacts and synergies of contiguous rural and urban landscapes. This mosaic of densely populated areas next to forests and agricultural landscapes is unique to Pennsylvania and the Mid-Atlantic Region and requires an integrated strategy to achieve healthy and thriving agriculture, natural systems, economies, and communities.

A primary component of AES and Extension work in our College will be built on the three integrated pillars of intensification, resilience, and regeneration of agricultural landscapes as solutions to some of the most vexing problems confronting Pennsylvania and similar mosaic landscapes worldwide. We will holistically and comprehensively address these critical issues:

- increasing the efficiency and profitability of agricultural production while minimizing environmental impacts

- equipping farmers to absorb and recover from short-term emergencies and/or long-term stresses to their agricultural production and livelihoods

- optimizing plants, animals, and ecosystems for resilience to and/or faster recovery from environmentally related stresses
- developing strategies for better management of nutrient inputs and outputs across complex agricultural and natural resource systems, from local fields and farms to large watersheds
- harnessing spatial data and remote sensing technologies to map and model predictive simulations of environmental change

## Merit and Scientific Peer Review Processes

Both Extension and AES programs undergo comprehensive review utilizing a number of merit review processes.

Internal university panels will be used to review AES projects. The Hatch, McIntire-Stennis, Animal Health, and State projects will be internally reviewed at initiation by at least two qualified faculty. In addition, external university panels are used for Multistate Research Project (MRP) activities. Both Extension and academic faculty are encouraged to participate to meet the jointly agreed objectives. These projects are reviewed multiple times through the five-year duration.

External non-university panels are used as new Extension programmatic issues or AES projects are implemented. Stakeholder and/or program advisory groups provide ongoing review of programs to ensure a focus on priority needs as identified by advisory groups. Reviewers' comments provide mechanisms for improving our educational and research programs.

Combined internal and external university panels are assigned to each of the programmatic issues. These panels are integrated, multidisciplinary State Program Teams made up of field-based Extension educators and faculty with split appointments in both Extension and research. Team members broadly represent all parts of the Commonwealth, and faculty members are chosen to represent relevant research and Extension perspectives. Extension Program Leaders provide overall leadership to the State Program Teams, and programs are reviewed by Extension administrators. State administrators and academic unit leaders serve as liaisons to each team. Each State Program Team develops a program plan, based on logic model components, that will guide Extension programming and applied research efforts.

## Stakeholder input: Action Taken to Seek Stakeholder Input

College administration, faculty advisory groups, and state program team leaders will confer regularly with key stakeholder groups, state and federal partners, and relevant industry representatives across the breadth of interests in the College. Listening sessions, targeted invitations, surveys, focus group meetings, and engagement on social media will all seek input from traditional and nontraditional stakeholder groups and/or individuals. A primary avenue for stakeholder input is via the various forms of feedback obtained in connection with Extension offerings, from volunteered comments and formally sought assessments of learning and effectiveness to retrospective evaluations that seek to measure outcomes such as costs averted or profit increased from implementing Extension program suggestions. All of these forms of feedback will be taken together to help set the course for Extension and AES programs. The results of these assessments will be incorporated into our Extension Program SharePoint site.

## Stakeholder input: Methods to Identify Individuals and Groups

The Penn State Ag Council (Ag Council) will assist our programs with identification and selection of stakeholder individuals and groups. Ag Council members will be selected to represent diverse program areas, emerging issues, geographic areas, and populations (diverse in, for example, race/ethnicity, age, longevity in the ag field, rural/urban, and those historically underserved by Extension). Ag Council meetings will be publicly announced, and broad representation will be constantly reassessed to ensure the inclusion of new and traditionally underserved audiences. Our Latinx Agricultural Network consists of producers, processors, and Latinx agricultural leaders in Pennsylvania. The network regularly engages with College leadership to provide feedback and identify opportunities to serve the Latinx community. Maintaining contact with College alumni builds direct links to our stakeholder groups and industries. Alumni and friends' banquets and football tailgates are common and well received throughout the College.

## Stakeholder input: Methods for Collecting Stakeholder Input

To collect stakeholder input, educators or faculty will hold regularly scheduled meetings, such as advisory groups and Penn State Ag Council. Ag Council members will work with program teams to develop relevant science- and industry-based programs to meet the educational needs of the residents of the Commonwealth. This effort is part of the Program Development Process. Meetings will occur with traditional and non-traditional individuals and groups. During and after Extension programs, participants may verbally or through surveys request additional programs or updates or provide input about effectiveness, both immediate and long term. To collect more detailed information from traditional and nontraditional stakeholders, sophisticated survey instruments or focus group meetings will be implemented and the data analyzed. All departments and Extension programs will maintain websites and distribute regular electronic and/or hardcopy communications and/or social media messages to inform stakeholders and to invite feedback. Many programs will hold field tours or site tours (as COVID-19 safety precautions allow), which allow them to hear from stakeholders directly. The dean's industry tour series will bring some of the College's leaders into some of the state's leading agricultural industry facilities to learn about their challenges and about how Penn State researchers might help.

## Stakeholder input: A Statement of How the Input Will Be Considered

**Budget Process:** Availability of funding from certain extramural funding sources will influence resource allocations.

**To Identify Emerging Issues:** Stakeholder feedback will help to identify emerging issues, such as the effects of COVID-19 on agricultural operations and food safety, that would benefit from Extension programming and/or research.

**Redirect Extension Programs:** Information collected from stakeholders will continue to be used to adjust issue areas for Extension programming.

**Redirect Research Programs:** Information collected from stakeholder groups, such as industry associations, will continue to be used to directly influence applied research activity through local decisions about priorities.

In the Staff Hiring Process: Information collected from stakeholders will continue to influence hiring decisions for faculty and Extension educators to address unmet needs. Stakeholder feedback also indicates where volunteers and donors would be interested in assisting with programs and initiatives.

In the Action Plans: Our mission is to serve our stakeholders, so we will analyze the information gathered from stakeholders and adjust our action plans as needed to meet their needs.

To Set Priorities: Our stakeholders' priorities must be our priorities, and we will adjust our programs as needed.

To Determine How and Where Programs are Offered: Stakeholder input will continue to directly impact how, where, and when we offer our Extension programs. We have been developing and implementing many different platforms for information transmittal in response to previous feedback from stakeholders that additional methods of program delivery were needed as demands for resources and/or time increase. We now offer podcasts, online webinars, videos, field tours, etc., by synchronous and asynchronous means, and continue to migrate away from the traditional classroom setting. We want to maximize the utility of Extension educators' time in the field by increasing the depth and breadth of routine educational materials available online. As noted earlier, Extension will use rigorous evaluation strategies to determine the best practices and lessons learned from the pandemic to influence future face-to-face and online engagement with stakeholders.

## Critical Issues

### **Advancing Agricultural and Food Systems**

Initiated on: Nov 26, 2019

State: Pennsylvania

Term Length: Long-term (>5 years)

To meet coming challenges of climate change and increasing human population, agriculture must reduce its required inputs of energy, water, and chemicals while simultaneously increasing crop productivity and producer profitability and improving soil health. Topics will include:

- resiliency in food systems
- agricultural labor shortage
- efficiency of energy and inputs to agriculture
- value-added aspects of commodities
- plant production and protection
- livestock production and reproduction
- pollinator health
- microbiome advances
- agricultural, natural resource, and biological engineering

Science Emphasis Area

Agroclimate Science, Environmental Systems, Sustainable Agricultural Production Systems

## **Building Community Resilience and Capacity**

Initiated on: Nov 26, 2019

State: Pennsylvania

Term Length: Long-term (>5 years)

Communities need to build greater resiliency to natural and economic disasters; diversify their economies; restore and sustain robust infrastructure; increase the efficiency of community support systems; and identify and implement cost-effective policies. Our specialists will address topics including:

- sustainable infrastructures and food systems
- economic promotion and resilience
- implications of shale gas energy
- agritourism
- entrepreneurship
- changing and declining rural areas
- trend analysis to meet communities' needs
- economic, market, and policy analysis
- identifying and helping to meet the needs of underserved populations

Science Emphasis Area

Environmental Systems, Family & Consumer Sciences, Youth Development

## **Developing Biologically Based Materials & Products**

Initiated on: Nov 26, 2019

State: Pennsylvania

Term Length: Long-term (>5 years)

Our researchers will help to meet the promise of sustainable clean energy, beneficial reuse of agricultural waste, and income generation through new, value-added bioproducts to support struggling rural economies. Research commercialization and industry engagement are increasingly important as we seek real-world solutions that work. Topics will include:

- value-added products from biomaterials
- sustainable energy sources
- new biomaterials exploration and development
- beneficial reuse of agricultural wastes
- eco- and human health-friendly products
- new and improved food sources and products, and processing and packaging technologies

Science Emphasis Area

Bioeconomy, Bioenergy, and Bioproducts, Environmental Systems

## **Fostering a Positive Future for Youth, Families, & Communities**

Initiated on: Nov 26, 2019

State: Pennsylvania

Term Length: Long-term (>5 years)

The urban/rural divide continues to grow. The lack of employment options and the opioid crisis take a heavy toll on rural areas. Efforts to foster healthy individuals, families, and communities will cut across local, state, and national boundaries; build sustainable community institutions and strong new leaders; and strengthen intergenerational relationships. The focus will be on:

- engaging youth, women, and minorities in social action and leadership
- individual and family resource management
- human development and family well-being
- community institutions, health, and social services
- farm safety

Science Emphasis Area

Education and Multicultural Alliances, Family & Consumer Sciences, Youth Development

### **Promoting Environmental Resilience**

Initiated on: Nov 26, 2019

State: Pennsylvania

Term Length: Long-term (>5 years)

Society faces increasingly challenging environmental issues as the effects of climate change intensify; the human population grows; water, food, and energy supplies tighten; and land use change and urbanization limit our options. To tackle these issues, our faculty and programs will address:

- air quality
- water quality and quantity
- adaptation to climate change
- land use change
- invasive species
- integrated pest management
- assessment of and protection of ecosystem services
- forest health and fragmentation
- ecosystem resilience
- soil health
- fish and wildlife ecology
- effects of agricultural production on the environment

Science Emphasis Area

Agroclimate Science, Environmental Systems, Sustainable Agricultural Production Systems

### **Supporting Integrated Health Solutions**

Initiated on: Nov 26, 2019

State: Pennsylvania

Term Length: Long-term (>5 years)

Climate change is already affecting the areal extent of some human and livestock diseases and parasites and how they spread, and this is expected to intensify. Decreased access to clean water and healthy

food poses health risks. We are making gains in food safety and learning more about the microbiome that we can use to promote health. Topics will include:

- functional foods for positive health outcomes
- human nutrition
- food safety concerns
- livestock health and reproduction
- interplay between human and animal health
- insect-borne and zoonotic diseases and parasites
- hazards to human health and safety
- new and improved food products and food processing technologies
- the effects of foods or nutrients on the microbiome in maintaining health
- access to medical and mental health services

Science Emphasis Area

Environmental Systems, Food Safety, Human Nutrition