

Delaware (Delaware State University, University of Delaware Combined)

Plan of Work for 2023-2027

Status: Final (Approved 9/28/2022)

Executive Summary Overview

Agriculture in Delaware remains strong today, with the Delmarva broiler industry the biggest agriculture commodity. The state has 490,000 acres of cropland (45% irrigated) that provide the grain crops needed for a thriving poultry industry, an innovative and profitable fruit, and vegetable production industry, and a "green industry" that supports horticultural and natural resource interests of its citizens. A 2010 report led by the University of Delaware College of Agriculture & Natural Resources ("The Impact of Agriculture on Delaware's Economy") found that the total economic contribution of all categories of agriculture in Delaware was \$7.95 billion in industry output and that the agricultural industry contributed \$2.5 billion in value-added activity, and \$1.6 billion in labor income, supporting 30,000 jobs. Our plan of work is created and reportedly jointly with the University of Delaware and Delaware State University. Our intention is to provide research-based solutions to the complex, global challenges facing Delaware today. It is important to note that divisions between these programmatic efforts are artificial. Our research and extension efforts are most commonly conducted by multi-disciplinary teams working across programs, in collaboration with colleagues in other disciplines. We also regularly plan and work with stakeholders in other University departments, other governmental agencies, foundations, community groups, universities, and political or policy-making positions. Delaware is also uniquely situated geographically to share across states in the mid-Atlantic region and positions and programs are utilized across state lines.

Our work is defined in four broad critical issues with several subheadings within some categories to further define the issues. It has been designed to help Delaware agriculture remain competitive, to meet its environmental challenges, sustain the state's natural resources and support our rural and urban youth, families, and communities. We focus on the following critical Issue areas:

1. Sustainable Production systems for Agricultural and Urban Landscapes

Situation: We will be continually challenged to feed the world's growing population. There are currently 7.6 billion people in the world and population is estimated to be over 10 billion by 2050. Further increases in agricultural output are essential while maintaining economic and environmental integrity. In a 2018 Needs Assessment Survey conducted by Delaware Cooperative Extension, respondents indicated that "supporting family farms and local food systems", "balance of environmental regulations and agricultural production", and "profitability of agriculture" were very important. Sustaining our food system is foundational to the missions of Delaware's higher education institutions and requires an interdisciplinary approach, involving almost all of our faculty as well as partners from state government and the private sector. To be sustainable, agriculture must be 1) profitable for the producer; 2) affordable, safe, and nutritious for the consumer; and 3) respectful of the environment. Without any

one of the three, the system fails. Beyond food, Delaware's research has, and will continue to focus on sustainable landscape design and management and sustaining the world's ecosystems by conserving natural resources and enhancing biodiversity and resiliency. The Delmarva region provides an excellent setting in which to study sustainability since it is a relatively populous, environmentally sensitive region of the country. Additional Research Foci: Genetics & genomics for plant, animal, and ecosystem improvement: Situation: Increasing agricultural production efficiency has long relied on improving plant cultivars and animal breeds. However, the grand challenge of a further doubling of agricultural production in the face of burgeoning population requires new approaches to crop and animal improvement. One answer to this challenge will be in leveraging genetic information using the tools of 21st century biology. Delaware has made key investments in physical infrastructure and human capital supporting genetics and genomics research.

2. Nutrition and Wellness

Situation: Nutrition & Wellness According to the Delaware Healthcare Commission report of June 2017, health care costs and spending per capita in Delaware are higher than the national average. Historically, health care spending has outpaced inflation and the state's economic growth. Health care costs consume 25% (or approximately 1 billion in FY 2017) of Delaware's budget. Medicaid cost per capita and the growth in per capita spending have been above the national average. Healthcare resources in Delaware are burdened by preventable conditions related to behavioral health and poor nutrition and the resulting chronic diseases. From the Cooperative Extension Survey of 2018, 69% of women and 57% of men surveyed rated prevention of chronic disease as very important. Sixty- nine percent of respondents to the Extension needs assessment survey indicated that preventing substance abuse was an important issue and 67% of respondents felt access to substance abuse services were important community issues.

In Delaware, the poverty rate for individuals was 12 percent in 2015. Research has indicated that poverty along with other social determinants of health must be addressed. As a result of COVID, a portion of our work will need to include working together with partners across the food system to provide additional ways to provide food access to limited resource audiences and include mental health for all with agriculture producers and youth as priority.

Situation: Food Safety Foodborne illnesses are common and costly – yet preventable – public health issue. According to the Centers for Disease Control and Prevention, approximately one in six Americans (nearly 48 million people) get sick, 128,000 are hospitalized and 3,000 die of foodborne illnesses each year (CDC, 2017). Food safety education is essential for individuals preparing food in their own home, farm workers growing produce, employees in food service establishments and individuals preparing and serving food as volunteers. Laws are in place to address this. For example, the State of Delaware now requires every permitted food establishment to designate a person in charge to demonstrate safe food handling practices. There are over 3,500 permitted food establishments in Delaware that prepare and serve food to the public and education is needed for their employees. The FDA Food Safety Modernization Act (FSMA) went into effect on January 26, 2016. The Produce Safety rule which is part of that act establishes for the first-time science-based minimum standards for the safe growing, harvesting, packing, and holding of fruits and vegetables grown for human consumption.

FSMA affects over 100 farm families in Delaware that grow fresh produce.

3. Personal and Economic Development

Situation: Leadership Development- Working with volunteers is an Extension tradition (Patton, 1990) as well as the primary method of delivering 4-H programs. Extension professionals engage volunteers by involving them in a variety of roles and delegating to them responsibility for projects, programs, events, and activities. (<https://www.joe.org/joe/2007december/a3.php>). In Delaware, Extension volunteer programs continue to grow and expand to support our Extension professionals and programs in 4-H Youth Development, Agriculture and Natural Resources, Lawn and Garden, and Family and Consumer Sciences.

In 2018 a Needs Assessment Survey was conducted by Delaware Cooperative Extension; 30% of the respondents self- identified as Extension volunteers. Survey respondents identified the following as important: 68% developing leaders within schools, organizations, and communities; 69% access to community-based programs for youth; 81% exposing youth to science, technology, engineering, and math topics; and, 85% training youth and adults to think critically and use problem-solving skills. Expanding volunteer and leadership development programs is a priority.

Situation: STEAM Education-Today and in the future, there is a tremendous need for young people to know how to be innovative, creative, out-of-the-box thinkers able to use computational thinking and technology to address real-world solutions. This is true across every industry, from business to creative arts to agriculture. Estimates show that 65% of today's students entering grade school this year will be employed in jobs that don't exist yet, and 60% of new jobs created this century will require Science Technology Engineering Arts and Math skills in a variety of fields.

Situation: Economic Development-The economic and financial wellbeing of individuals, families, agribusiness, other small business enterprises, and our communities throughout Delaware are inter-related and are connected to the broader economic context of our state and national economy. Wages have not kept up with inflation, health care has become more expensive, overall consumer prices have increased and US employees aren't confident about reaching their long-term goals. Following COVID, this situation is significantly worsened. In an era when Delaware is losing its manufacturing base, the agriculture industry can be a sector targeted to expand economic growth.

Research Foci:

Human dimensions of food, agriculture and natural resources Situation: Some would say that if we just applied what we knew already, we could solve many of the grand challenges in agriculture and natural resources. While our science has produced several possible solutions for enhanced food production and natural resource conservation, changing behavior in people is quite often the barrier to implementation and ultimately, positive change. Some solutions are simply viewed as uneconomical, misaligned with current government policy and regulation, or too risky to be implemented. We must focus on the human dimensions of our problems, or we will be less impactful and relevant to the public we serve. In addressing this need, scientists across the state of Delaware are engaging with their colleagues in the social sciences and humanities for better engagement with the human societal systems that will be crucial for implementing policies that will result in improving agricultural production efficiency with greater sustainability.

4. Environmental Stewardship in a Changing Climate

Situation: Many of Delaware’s natural resources, including our waters and natural landscapes, are stressed by human activities and a changing climate. For example, more than 90% of the streams, ponds, and bays in Delaware are classified as impaired, primarily by excess nitrogen and phosphorus, and pollution limits have been established by government agencies. Additionally, climate change is stressing Delaware’s agriculture and natural ecosystems with new pest pressures, more intense weather events and saltwater inundation from sea level rise. Climate change is complicating existing efforts to reduce nutrient pollution in the state.

In a 2018 Needs Assessment Survey conducted by Delaware Cooperative Extension, 93% of respondents indicated that “ensuring the availability of clean water” was “very important”. This was the highest-ranked issue among the state-level issues that were considered in the survey. One major focus has been reducing nutrient pollution from lawns and agriculture through education, development of science-based nutrient management practices, and promoting compliance with state nutrient management regulations. Additionally, integrated pest management practices are being developed and promoted to reduce the impact of pesticides on the environment.

Research Foci: Climate change – impacts, mitigation, and adaptation

Merit and Scientific Peer Review Processes

Research does an internal peer review on Hatch projects. Merit review for Delaware Cooperative Extension consists of peer and stakeholder review. Extension professionals submit individual plans that have been reviewed by their peers and by stakeholder advisory groups. These stakeholder groups including advisory group, community organizations, volunteers, research partners, and state and local funding agencies provide input on critical needs and issues within their communities, which is used to develop the state plan. Each of these plans includes specific objectives that are examined for relevance, usefulness, and potential impact of the programs. This feedback is used to refine individual and state plans and develop future plans. The second level of review is by collegewide issue teams that are cross-functional and multi-disciplinary. The county plans and research plans are combined into a college-wide plan. The College plan is submitted to the College Advisory Committee. These individuals are invited to comment on the objectives identified, areas of collaboration, and potential impacts. University administrators are also asked to comment on ways in which we might work across colleges and schools to increase our outreach efforts.

Stakeholder input: Action Taken to Seek Stakeholder Input

Use of media to announce public meetings and listening sessions.

Targeted invitation to traditional stakeholder groups

Targeted invitation to non-traditional stakeholder groups

Targeted invitation to traditional stakeholder individuals

Targeted invitation to non-traditional stakeholder individuals

Targeted invitation to selected individuals from general public

Survey of traditional stakeholder groups

Survey specifically with non-traditional groups

Survey of selected individuals from the general public

In 2018, the University of Delaware and Delaware State University undertook a formal statewide needs assessment process to formulate our next federal plan of work. Program Leaders identified one person per program area to participate on the stakeholder needs assessment development team. The team reviewed sample needs assessment survey tools used by various states and decided to blend several approaches for our survey instrument. The Spanish and English survey resulted in 690 responses.

Additionally, in the state of Delaware, the University of Delaware and Delaware State University use a multi-faceted approach to secure stakeholder input. We believe in direct contact with people and actively solicit input from a wide variety of clientele, users and stakeholders. College administrators, faculty working on research funded by state and federal agencies or industry, and Cooperative Extension staff regularly request input on the relevance of our research and extension priorities to state and regional problems. UD College of Agriculture and Natural Resources has a comprehensive College Advisory Board that meets twice a year and provides overall input into academic, research and extension programs. DSU College of Agriculture Science and Technology also participate in numerous formal opportunities for input from stakeholders and include, but are not limited to, the following: extension and college overall advisory committees, extension issue-based advisory committees, strengthening families statewide advisory committee,

4-H volunteers, 4-H Foundation, agriculture commodity groups, environmental interests, the green industry, agribusinesses, agriculture associations (i.e., Farm Bureau, Grange, Pork Producers Association, Delmarva Poultry Industry, Soybean Board, Sheep Producers Association, etc.), Volunteer Programs. We meet with these groups on a regular basis and request their input on our programs and encourage their involvement in all of our planning and evaluation efforts

Stakeholder input: Methods to Identify Individuals and Groups

Use Advisory Committees

Use External Focus Groups

Open Listening Sessions

Needs Assessments

Other (Statewide needs assessment)

Statewide needs assessment initiation involved each Extension Agents and Specialists at both UD and DSU to distribute the survey to at least ten stakeholders that they work with directly inviting them to participate in the needs assessment. There are approximately 40 UD staff and 20 DSU staff for potential distribution to at least 600 internal stakeholders. A number of staff maintain large email databases, so the actual distribution would far exceed this number. A few staff members noted that their clientele does not have access to, or do not feel proficient with computers. Therefore a paper version was prepared and staff manually entered those responses into Qualtrics as completed paper forms were received. To reach external stakeholders, a message was included in both the introductory statement and at the close of the survey requesting that respondents further distribute the survey to at least five

others who may be interested in providing feedback. This is a form of snowball sampling. In addition, the survey was also posted on UD and DSU Extension Facebook and Twitter pages, which staff was encouraged to share with their personal social media networks in order to further distribute the survey to external stakeholders. In an effort to reach Spanish speaking populations, a second version of the survey was developed that allowed the survey taker to select their preferred language. If Spanish was chosen, the survey automatically translated from English into Spanish.

Additionally, Stakeholders are identified by a combined effort of college administrators, research and teaching faculty, and cooperative extension staff. We are very familiar with our traditional agricultural stakeholders and have established a number of advisory committees, at the county and state levels, to provide input on our research and extension programs. Similarly, we have long-standing contacts and good relations with many individuals, organizations, and agencies involved in our research and extension programs. We work hard to ensure that these committees represent the range of agricultural production systems present in the state, the interests of those concerned about natural resources and the environment, and the social and economic issues related to communities, families, and youth development. We also take proactive steps to ensure that our advisory committees encompass the increasing diversity (age, gender, background, ethnic group) of our stakeholders. When new issues come forth, or a need for re-organization and re-direction of an existing program arises, we often establish focus groups composed of a mix of individuals internal and external to our universities to help guide our planning and to ensure that all interested parties are contacted for input. As appropriate, we also will use surveys and open listening sessions to solicit input from the public. In particular, when new faculty comes on board focus groups with stakeholders are held to provide direction to individual plans. Stakeholders serve on each of our advisory search committees when new faculty and staff positions are filled.

Stakeholder input: Methods for Collecting Stakeholder Input

Meeting with traditional Stakeholder groups

Meeting with traditional Stakeholder individuals

Meeting with the general public (open meeting advertised to all)

Meeting specifically with non-traditional groups

Meeting with invited selected individuals from the general public

Other (1.Meetings with permanent advisory committees 2. Distribution of Statewide Needs Assessment Survey)

The statewide needs assessment conducted in 2018 was a major checkpoint on program priorities. We also hold a variety of regular meetings across the state, which include a diverse mix of clientele, users, and stakeholders. These meetings include such things as: State Chamber of Commerce, Kids County Advisory Council, Delaware Public Policy Institute Task Force, Council of Farm Organizations, USDA Food and Agricultural Council, State Agriculture Technical Committee, and user groups like 4-H parents and leader advisory groups Students enrolled in our colleges, faculty, professionals and salaried staff, are all encouraged to provide input on program priorities. We have conducted random surveys of users and

non-users of the programs and activities on a variety of issues including land use and economic development. Other tools that we use to get input include visioning processes and focus groups. All of these efforts have been focused on both building commitment and getting input from stakeholders such as government agencies, industry partners, and regulatory agencies. Our programs have expanded, and input continues to increase. We are recognized as a source of not only useful but also reliable information. We will continue to seek input in a variety of ways. These methods will change as the issues themselves change.

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

To Identify Emerging Issues

Redirect Extension Programs

Redirect Research Programs

To Set Priorities

We value all input from our stakeholders and use it to guide a number of our applied research and extension programs. It is particularly valuable in our efforts to make sure that any new and emerging agricultural, environmental, and social issues are identified early and that programs are developed to address them effectively. We carefully consider stakeholder input in our periodic reviews of extension programs to ensure that our goals are up-to-date and that we have the appropriately trained staff in place to meet these goals. We also use stakeholder input to identify areas where research is perceived to be needed. In some cases, where an adequate research base is already available, we respond through an increased extension effort to communicate research findings to end-users. However, if stakeholders identify areas where new or expanded research or extension is needed, we use their input to strengthen our requests for research support from funding agencies and to identify partners that can collaborate in research projects. The Colleges Advisory Committee reviews and provides final input.

Critical Issues

Environmental Stewardship in a Changing Climate

Initiated on: Nov 26, 2019

State: Delaware

Term Length: Long-term (>5 years)

Environmental Stewardship in a Changing Climate

Situation: Many of Delaware's natural resources, including our waters and natural landscapes, are stressed by human activities and a changing climate. For example, more than 90% of the streams, ponds, and bays in Delaware are classified as impaired, primarily by excess nitrogen and phosphorus, and pollution limits have been established by government agencies. Additionally, climate change is stressing Delaware's agriculture and natural ecosystems with new pest pressures, more intense weather events and saltwater inundation from sea level rise. Climate change is also likely to complicate existing efforts to reduce nutrient pollution in the state.

In a 2018 Needs Assessment Survey conducted by Delaware Cooperative Extension, 93% of respondents indicated that “ensuring the availability of clean water” was “very important”. This was the highest-ranked issue among the state-level issues that were considered in the survey. Delaware Cooperative Extension is working with individuals, farms and the horticulture industry to promote environmental stewardship in the state. Cooperative Extension is using research to develop management practices that will allow Delawareans to adapt to a changing climate and protect and conserve our natural resources. One major focus has been reducing nutrient pollution from lawns and agriculture through education, development of science-based nutrient management practices, and promoting compliance with state nutrient management regulations. Additionally, integrated pest management practices are being developed and promoted to reduce the impact of pesticides on the environment

Science Emphasis Area

Agroclimate Science, Sustainable Agricultural Production Systems, Youth Development

Food Safety

Initiated on: May 28, 2019

State: Delaware

Term Length: Long-term (>5 years)

Situation: Foodborne illnesses are common and costly – yet preventable – public health issue. According to the Centers for Disease Control and Prevention, approximately one in six Americans (nearly 48 million people) get sick, 128,000 are hospitalized and 3,000 die of foodborne illnesses each year (CDC, 2017). Food safety education is essential for individuals preparing food in their own home, farm workers growing produce, employees in food service establishments and individuals preparing and serving food as volunteers. Laws are in place to address this. For example, the State of Delaware now requires every permitted food establishment to designate a person in charge to demonstrate safe food handling practices. There are over 3,500 permitted food establishments in Delaware that prepare and serve food to the public and education is needed for their employees. The FDA Food Safety Modernization Act (FSMA) went into effect on January 26, 2016. The Produce Safety rule which is part of that act establishes for the first-time science-based minimum standards for the safe growing, harvesting, packing, and holding of fruits and vegetables grown for human consumption. FSMA affects over 100 farm families in Delaware that grow fresh produce. Every year, dozens of recalls occur. In an effort to help individuals in the food service industry comply with licensing regulations through the Delaware Division of Public Health, Cooperative Extension provides training for Delawareans.

Science Emphasis Area

Nutrition and Wellness

Initiated on: Nov 26, 2019

State: Delaware

Term Length: Long-term (>5 years)

Situation: Nutrition & Wellness In Delaware, the poverty rate for individuals was 12 percent in 2015. Research has indicated that poverty is associated with poor nutrition and increased risk of many diseases. The CDC reports that DE youth Dietary Behaviors were 36.9% of adolescents reported consuming fruit less than one time daily. For physical activity, only 23.7% of adolescents were physically

active at least 60 minutes per day on all 7 days in the past week as recommended. As a result of COVID, a portion of our work will need to include working together with partners across the food system to provide additional ways to provide food access to limited resource audiences

Situation: Behavioral Health and Well-being Given the COVID situation in the state we will have to realign some of our well-being work to include mental health for all and include our agriculture producers as a specific audience. Survey work at present is helping to identify specific needs with the agricultural audience

Situation: Food Safety Foodborne illnesses are common and costly, food safety education is essential. The FDA Food Safety Modernization Act (FSMA) went into effect on January 26, 2016. The Produce Safety rule which is part of that act establishes for the first-time science-based minimum standards for the safe growing, harvesting, packing, and holding of fruits and vegetables grown for human consumption. FSMA affects over 100 farm families in Delaware. In an effort to help individuals in the food service industry comply with licensing regulations through the Delaware Division of Public Health, Cooperative Extension provides training for Delawareans. Food safety issues for both producers and consumers will be a priority focus specifically as related to the COVID environment. We will have some specific research agendas in this area as well led by faculty member, Kali Kniel.

Science Emphasis Area

Education and Multicultural Alliances, Family & Consumer Sciences, Food Safety, Human Nutrition, Sustainable Agricultural Production Systems, Youth Development

Personal and Economic Development

Initiated on: Nov 26, 2019

State: Delaware

Term Length: Long-term (>5 years)

Personal and Economic Development Situation: Leadership Development- Extension professionals engage volunteers by involving them in a variety of roles and delegating to them responsibility for projects, programs, events, and activities. Delaware Extension' goal to expand the learning-leadership environment through programs and opportunities will facilitate the pursuit and acceptance of leadership roles in our system and across the state to help all, especially youth, reach their full potential. We will need to include new ways of working with leaders in a virtual environment.

Situation: STEAM Education- Estimates show that 60% of new jobs created this century will require Science Technology Engineering Arts and Math skills in a variety of fields. Delaware Cooperative Extension's 4-H and youth development programs understand the solution is to continue the tradition of exposing youth to STEAM topics at an early age through learning experiences that are hands-on, sequential, fun and relatable to the real world. Due to COVID, developing these skills in a virtual environment will be required in this year.

Situation: Economic Development-The economic and financial wellbeing of individuals, families, business, and our communities throughout Delaware are inter-related and are connected to the broader economic context of our state and national economy. The well-being of individuals, families, especially minorities are determined by their access to jobs, health care, educational opportunities, and training. In an era when Delaware is losing its manufacturing base, the agriculture industry can be a sector targeted

to expand economic growth. Due to COVID, this situation is significantly worsened and we do not currently have the data on the impact of this virus. We are aware that those of limited resources prior to COVID are the most likely impacted in a profound way.

Science Emphasis Area

Education and Multicultural Alliances, Family & Consumer Sciences, Sustainable Agricultural Production Systems, Youth Development

Science, Technology, Engineering, Arts & Math

Initiated on: May 28, 2019

State: Delaware

Term Length: Long-term (>5 years)

Situation: Today and in the future, there is a tremendous need for young people to know how to be innovative, creative, out-of-the-box thinkers able to use computational thinking and technology to address real-world solutions. This is true across every industry, from business to creative arts to agriculture. Estimates show that 65% of today's students entering grade school this year will be employed in jobs that don't exist yet, and 60% of new jobs created this century will require Science Technology Engineering Arts and Math skills in a variety of fields. However, the stark reality is that not enough of today's young people are being drawn to STEAM in school. As a result, young people are not being adequately prepared with the STEAM skills needed for the new and lucrative jobs of the future. This poses a major threat to the country's economic prosperity. Delaware Cooperative Extension's 4-H and youth development programs know a major part of the solution to this problem is to continue the tradition of exposing youth to STEAM topics at an early age through learning experiences that are hands-on, sequential, fun and relatable to the real world.

Science Emphasis Area

Sustainable Production Systems for Agricultural and Urban Landscapes

Initiated on: Nov 26, 2019

State: Delaware

Term Length: Long-term (>5 years)

Sustainable Production systems for Agricultural and Urban Landscapes

Situation: We will be continually challenged to feed the world's growing population. There are currently 7.6 billion people in the world and population is estimated to be over 10 billion by 2050. Further increases in agricultural output are essential while maintaining economic and environmental integrity. In a 2018 Needs Assessment Survey conducted by Delaware Cooperative Extension, respondents indicated that "supporting family farms and local food systems", "balance of environmental regulations and agricultural production", and "profitability of agriculture" were very important. Delaware Cooperative Extension is working with individuals, farms, and the agricultural industry to improve and increase economic and environmental integrity and food security.

Cooperative extension is using research and education to develop, disseminate, and promote management practices that maximize yield, maintain profitability, and utilize nutrients, water, and pesticides efficiently and effectively.

With the onset of COVID we will need to provide education around production systems, marketing and labor management within agronomic and turf and ornamental systems will need to be addressed as well.

Science Emphasis Area

Agroclimate Science, Environmental Systems, Sustainable Agricultural Production Systems