New Jersey (Rutgers the State University of New Jersey New Brunswick Campus)

Plan of Work for 2023-2027

Status: Final (Approved 9/29/2022)

Executive Summary Overview

With over 9.1 million residents living within 8,729 square miles, NJ is the only state defined by the U.S. Bureau of Census as 100 percent metropolitan. As the most urbanized and densely populated state in the nation, NJ faces significant challenges. It is a study in contrasts, with large cities, lightly populated rural areas characterized by forests and farmland, and wide swaths of suburban tracts. Despite being highly urbanized, NJ has a significant agriculture industry that contributes to local economies (annual farm gate revenue exceeds $1 billion), culture, and the state's physical landscape and natural resource bases. Agriculture remains an active use on 15 percent of the state's land base and represents more than half of the remaining stock of privately owned undeveloped land. In addition, NJ's coastal communities rely on tourism, aquaculture, commercial and recreational fishing, and related activities to fuel their local economies. Thus rising sea levels, environmental threats to ocean and coastal ecosystems, and sustainable management of fishery resources are important areas to address.

Rutgers University is NJ's land-grant institution and home to the NJ Agricultural Experiment Station (NJAES) and its associated extension unit, Rutgers Cooperative Extension (RCE). The NJAES/RCE has three co-equal leadership positions that report to the School of Environmental and Biological Sciences (SEBS)/NJAES Executive Director and are responsible for setting strategic goals and policies for NJAES.

The NJAES Office of Research is managed by the Director of Research, who also serves as the Dean of Research for SEBS. This Director leads grant facilitation and research administration to support submissions for grant and contract funding, promotes interdisciplinary research collaborations among SEBS/NJAES faculty and across the university, coordinates missions of SEBS-based institutes and centers with NJAES and departmental research goals, strengthens graduate and postdoctoral training, and deploys strategic investments in research infrastructure and core facilities.

The Director of Resource and Economic Development is responsible for strategically utilizing NJAES assets and budgets for on and off campus farms, research stations, incubators, and auxiliary units. They work in concert with unit leadership to identify and respond to constituent needs, maximize the efficiency and effectiveness of NJAES operations and their ability to support cutting edge research and outreach, and promote economic development.

Rutgers Cooperative Extension is led by the Director of RCE, who oversees the departments of agriculture and natural resources, family and community health sciences, and 4-H youth development, as well as the office of continuing professional education and other NJAES-mission related educational outreach programs. They also oversee and coordinate the efforts of the statewide system of county

extension offices, as well as federal programs including the Expanded Food and Nutrition Education Program.

Both the Director of Cooperative Extension and the Director of Research serve as the Authorized Technical Representatives for directing USDA-NIFA-funded activity and managing USDA-NIFA capacity grant funds in their respective functions. This authority is delegated to them by the Executive Director of SEBS/NJAES.

NJAES/RCE is integrally connected to stakeholders through various partnerships with organizations, public agencies, and policy makers in state and county jurisdictions. NJAES/RCE maintains close relationships with various agencies across the state, particularly the Department of Agriculture and the Department of Environmental Protection. By legislative mandate, the SEBS Executive Dean /NJAES Executive Director (or their designee), Director of Research, and Director of Extension serve on several federal, regional, and NJ state boards and councils.

Under statutory mandate, NJAES/RCE operates a program to certify professional pesticide applicators. The NJ Secretary of Agriculture is required by legislative mandate to consult with NJAES/RCE when issuing rules and regulations in several areas, including the use of pesticides in proximity to honeybee colonies, leaf composting on agricultural land, mosquito/vector control programs, and the development of integrated pest management training programs for schools. The designated State Climatologist is a Rutgers University faculty member associated with NJAES/RCE.

Most of the outreach to stakeholders occurs at county and local levels. NJAES/RCE maintains a presence in all of NJ's 21 counties with county-based extension offices. Here RCE county agents and program staff work to meet the needs of residents in areas including agricultural and environmental resource management, individual and family health and well-being, and youth development. Each county's Board of Agriculture appoints a representative to the NJAES Board of Managers to help inform NJAES and RCE about local needs and program priorities.

NJAES/RCE research and extension facilities are located throughout the state and include eight research farms, seven marine/coastal field stations, soil and plant diagnostic laboratories, three business incubators, and various field trial locations.

NJAES/RCE strives to develop and deliver practical science-based solutions that contribute to agricultural sustainability and health and wellness of our communities and the environment through research and community outreach. The Critical Issues that stakeholders have identified fall into five broad categories and form the basis of the NJAES work plan: 1. Build sustainable and resilient communities; 2. Ensure healthy outcomes: food, nutrition, health; 3. Ensure positive outcomes for our youth; 4. Maintain viable agriculture and aquaculture; 5. Protect and sustain our resources.

NJAES/RCE supports research and extension programs needed to deal with these Critical Issues in projects and programs focus on combating climate change, reducing reliance on non-renewable energy sources, dealing with the emergence of pesticide resistant pests and pathogens, and increasing food security. Our projects and programs are consistent with USDA-NIFA science priority areas. NJAES maintains its commitment to make its resources, expertise, and programs available to all NJ residents, businesses, and communities. This is manifest in active efforts to increase equitable access to all NJAES programs and resources.

The Plan of Work is an integrated plan that melds NJAES projects and RCE programs. This plan addresses all requirements set by the Agricultural Research, Extension and Education Reform Act of 1998 (AREERA) regarding the use of Hatch Funds, Smith-Lever 3(b) and 3(c) and required non-federal matching funds.

Through our research and extension programs, we use innovative approaches to apply the land-grant model to support a sustainable agricultural and food system at the urban/suburban fringe; protect the state's natural resources; sustainably develop NJ's human and community capital; and address nutrition, health and wellness concerns. Research development findings are delivered via educational programs and training, technology transfer, policy recommendations, public-oriented publications, peer-reviewed professional/scientific publications, and the formation of spin-off companies. This is achieved statewide through dozens of centers, institutes, and off-campus research stations and Cooperative Extension offices.

NJAES-supported SEBS faculty have access to state-of-the-art research methods and technologies. These include: land, sea, and air-based remote sensing robotic technologies; efficient genomic sequencing methods and equipment for use in techniques that include environmental DNA surveillance and genotyping through sequencing for plant and animal breeding; mass spectrometry systems for natural product analysis (including gas chromatography, liquid chromatography, and ion trap systems); high-resolution microscopy systems; flow cytometry; biomolecular fragment analysis systems; and high input/output computational technologies to gather and analyze data.

In addition to laboratory-based research, our Extension Specialists conduct applied research studies within NJ communities, and at agriculture and aquaculture farms and laboratories. They identify and assess relevant research findings and convey this information to stakeholders, either directly or through RCE county agents. This integration of research and extension delivers sound science-based information and educational programs that benefit communities, individuals, and industries. Additionally, NJAES-supported researchers also actively collaborate with their peers at other land-grant institutions to address issues that are regional or national in scope.

RCE county agents are faculty members of Rutgers University. They provide local educational leadership to deliver science-based programs in agriculture, resource management, family and community health sciences, and 4-H youth development. County agents are often involved in applied research projects, whose findings will be disseminated through RCE educational programming.

NJAES/RCE is deeply committed to reaching underserved and underrepresented populations in NJ. One of the primary goals of this effort has been educational programming that is culturally sensitive to the needs of urban youth and families. The Office of Urban Extension and Engagement was established to increase the coordination of programs and facilitate collaborations to address food security, individual and community health, resource stewardship, urban agriculture and food chains, environmental planning and design, and other concerns facing our state's urban communities.

Merit and Scientific Peer Review Processes

No significant updates.

Stakeholder input: Action Taken to Seek Stakeholder Input

Our work is all about our relationships with our stakeholders. We make ourselves available to as many stakeholders (or their representatives) as possible through a variety of venues. Our extension faculty are required to reach out to stakeholders and assess needs. Knowing that NJAES/RCE actively solicits stakeholder input encourages our stakeholders to collaborate with us. Governmental contacts and interactions are an important source of stakeholder input. In addition to being primary stakeholders themselves, these agencies are in touch with the needs of their constituencies and can help us connect with specific stakeholder groups. NJ state agencies include the NJ Departments of Agriculture, Environmental Protection, Human Services, and Health. NJAES is represented on several state-level advisory boards within these agencies. Our extension faculty and staff work closely with county and local government agencies, including their county commissioners, local municipal governments, public health agencies, mosquito control commissions, Boards of Agriculture, youth services commissions, and municipal water and sewage authorities. The NJAES Board of Managers provides an important conduit for stakeholder input to guide NJAES/RCE research and extension activity. This advisory board includes representatives from most New Jersey counties and representatives from key stakeholder interests (marine and aquaculture industries, food industry, and others). Board members conduct periodic needs assessments, actively elicit input from their county and industry constituencies, and provide timely input to identify, prioritize, and address stakeholder needs. plans. NJAES/RCE faculty and staff collaborate directly with stakeholders through working groups organized around agricultural commodity groups. Stakeholders are active members in these working groups, representing a broad range of commodity groups. Some of the most active examples include the New Jersey Turfgrass Association, NJ Blueberry and Cranberry Research Council, NJ Vegetable Growers Association, NJ Nursery and Landscapers Association, and NJ Soybean Board. Other working groups are organized around 4-H program areas, food safety, water management, and pesticide training and safety, among others. Several of our NJAES-supported research facilities have stakeholder advisory groups to help these centers focus their research and extension programs on important stakeholder needs. Through their participation in these advisory groups, stakeholders recognize that they have direct input into the design, development, participation, and sustainability of our programs.

Stakeholder input: Methods to Identify Individuals and Groups

As described above, NJAES faculty and staff routinely interact with a wide range of stakeholders from state and local government, agricultural commodity and other interest groups, private non-profit associations, and the general public. These interactions provide networking opportunities that allow us to identify and extend our services to groups and individuals from more non-traditional and/or less visible communities, as well as with stakeholders with emergent needs. For example, collaborations with non-profit groups that address youth development or family/community health issues provide a ready means to identify and reach new stakeholders to ascertain their needs, particularly among underserved populations such as at-risk or adjudicated youth and populations whose first language is not English.

Rutgers Cooperative Extension faculty and staff often partner with non-profit agencies to assess the needs of the populations that they serve and to develop and deliver appropriate programs. Routine program evaluations also provide useful information on stakeholder needs. Each spring, we open our campus, including the campus-based NJAES facilities and programs, to the general public. This event

(Rutgers Day) attracts citizens from all over the state, allowing us to connect with NJ's residential, nonagricultural, and urban populations.

Stakeholder input: Methods for Collecting Stakeholder Input

Methods for collecting stakeholder input range from formal data collection methods (e.g. surveys or focus groups) to informal interactions with our stakeholders. We use surveys and course evaluations to ask our program attendees if the program met their needs and expectations. We also inquire about other needs that can be addressed programmatically, and how our programs should be revised and expanded. Focus groups and one-on-one interviews are also part of our formal "tool kit" for gathering stakeholder input. These tools are especially useful to help identify and characterize problems and to develop appropriate research objectives and programs. In addition to these more formal methods, unstructured and/or informal stakeholder contacts also yield valuable information and insights into individual and community needs. These contacts yield information that stakeholders might not want to reveal in more structured information gathering settings. Venues such as county 4-H/agricultural fairs and street fairs, in addition to our own campus-based Rutgers Day, provide opportunities to connect with new audiences, learn about their needs, and inform them of NJAES/RCE services and opportunities. Research presentations at citizens groups can elicit valuable feedback to inform research agendas, methods, and community concerns. Routine information dissemination conducted by our faculty and staff are two-way streets that allow our stakeholders to respond to the information that they receive. Such conduits as routine meetings with specific stakeholder groups and web-based written communications (e.g. blogs) can elicit valuable input regarding unmet or emerging needs, as well as suggestions for improving existing programs and communications. Large regional or national conferences provide opportunities for extension and research personnel to interact with other researchers, growers, and chemical and other agriculture-related industry professional and technical staff. These interactions and conversations also inform research and extension activity and priorities. "Routine" communication includes a heavy social media presence. We use Facebook, Twitter, Instagram, and YouTube, among other platforms, to connect with known and potential stakeholders. Reactions to our posts are monitored for stakeholder response to the information that we post. All programs described on our website include the name and contact information for an employee who can answer any questions or provide more information about that program.

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

No significant updates.

Critical Issues

Build Sustainable and Resilient Communities

Initiated on: Nov 26, 2019
State: New Jersey

Term Length: Long-term (>5 years)

As the most densely populated state in the U.S., New Jersey faces unique challenges. Urbanization, environmental changes, and new technologies are reshaping the way we live, and communities must learn to adapt or establish new ways to use their resources to meet current needs while ensuring that

adequate resources are available in the future. NJAES/RCE is addressing a multitude of community issues identified by stakeholders.

NJAES/RCE develops and disseminates information on issues related to home horticulture (e.g., lawn and garden care, pest control, nutrient use, sound cultural methods) and household and community pest management (e.g., termites, ticks, bed bugs, mosquitoes). NJ residents, municipalities, and other managers of public lands or facilities including schools, parks, and recreation areas rely on this information.

NJAES/RCE provides comprehensive business development programming throughout the state through expansion of existing business incubation programs and creation of new programs, as well as expansion of virtual training opportunities, resulting in more sustainable and viable communities with improved quality of life for its residents.

NJAES/RCE has a substantial and continuing track record of working with local communities to help install green infrastructure projects to remediate problems associated with stormwater runoff, flooding, and water retention/reuse. Our projects encompass residential, agricultural, and industrial settings. NJAES also has growing engagement in solar and wind energy research, policy formulation, and demonstrations to help the state meet its renewable energy goals.

New Jersey's urban residents are at particular risk for food insecurity, as nutritious food may not be available in sufficient quantities to meet local consumer needs. RCE helps local farms and small grocery stores to provide affordable, culturally appropriate, and fresh food to their customers, and educates consumers regarding affordable and nutritious food choices. Locally grown food, using vacant warehouse space and other unused urban property, is another community-based solution currently under development with NJAES/RCE assistance.

NJAES/RCE continues to work with governmental agencies at the state and local levels, commercial businesses, professional groups, and non-profit agencies. Through these collaborations, RCE faculty/staff offer training and resources for professionals in all of New Jersey's 21 counties in the areas of food, nutrition, health/wellness, and food safety. RCE is approved by the New Jersey Department of Education to provide continuing education credits to teachers. Many of these RCE programs also offer professional development credits for registered dietitians, and family and consumer sciences professionals.

Communities are supported and enriched by the volunteers who put their time and talents to the service of their communities. Trained volunteers are an asset in all areas of community service. RCE provides training for volunteers for youth development programs (including 4-H), environmental stewardship, and horticulture programs administered through individual county extension offices. Individuals who want to address environmental issues that affect their communities and lives can receive volunteer training through RCE's Rutgers Environmental Stewards program.

Science Emphasis Area

Family & Consumer Sciences, Sustainable Agricultural Production Systems

Ensure Healthy Outcomes: Food, Nutrition, Health

Initiated on: Nov 26, 2019

State: New Jersey

Term Length: Long-term (>5 years)

Good health is essential to improving and maintaining individual productivity and quality of life, as well as to the wellbeing of the community at large. Fostering a culture of health and wellness for New Jersey residents of all ages is an important NJAES mission. NJAES/RCE promotes health and wellness through education, research, and integrated and multistate collaborations in food, nutrition, and healthy lifestyles, including vaccination. These programs play a crucial role in health promotion and chronic disease prevention and will provide learning targeted to support a culture of health to individuals, families, and the community at large.

The causes of obesity are complex and multi-factorial and include socioeconomic lifestyle and genetic factors. NJAES researchers explore multiple facets of nutrition, with a special focus on the underlying biochemical, physiological, and behavioral elements that cause or accompany obesity. RCE develops programs to encourage and facilitate healthy food choices, physical activity, and other strategies to help NJ residents attain and maintain healthy weight. RCE faculty and program staff address diverse unmet issues of nutrition and health, from teaching our most vulnerable residents about healthy eating on a budget to promoting the benefits of exercise. By bringing the best in research and education to respond to the urgent and growing challenges to nutrition and human health, NJAES/RCE programs guide NJ residents to better health. Programs are aimed at a range of populations, including special programs for NJ schools and early care centers to expose children and their families to healthy lifestyle choices. RCE programs also facilitate access to healthy food choices in our urban "food deserts."

NJAES researchers identify and document environmental, reproductive, and other causal factors that increase the prevalence of certain cancers and chronic health conditions. The human microbiome (i.e., gut bacteria) plays an important role in human health. NJAES researchers are exploring animal-human metabolic processing, various dietary interventions, and identification and development of natural products to modulate microbiota and improve human health. They also focus on the nutraceutical properties of various plants to identify health-promoting foods and supplements in so-called "functional foods." Through RCE, NJ residents can access various self-management workshops for the management of diabetes, cancer survival, and other chronic health conditions.

Food-borne illness is of great concern among both public health experts and the food industry. The adoption of safe food handling practices at all stages of food production and handling reduces the incidence of food-borne illness. NJAES research identifies sources of food-borne illnesses and effective methods to prevent/reduce their incidence. RCE programs provide food-safety education and information about risks of food-borne illnesses (from both contaminants and allergens) to NJ residents, farms, food processors, schools, and workplaces. On-farm food safety programs help agricultural producers manage food safety risks based on sound science, as well as aid them with compliance with federal and state regulatory requirements.

Science Emphasis Area

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

Ensuring Positive Outcomes for Our Youth

Initiated on: Nov 26, 2019

State: New Jersey

Term Length: Long-term (>5 years)

A significant portion of New Jersey's youth, especially in our urban areas, is at substantial risk for negative outcomes (e.g., poor health, substance abuse, pregnancy, school failure, and abuse). Sustained opportunities for young people to gain a sense of belonging, independence, mastery and generosity provide important life skills that ensure positive youth development.

The 4-H Youth Development Program, a major component of our youth development activity, uses a learn-by-doing approach to enable youth to develop the knowledge, attitudes, and skills needed to become competent, caring and contributing citizens of the world. This is accomplished by using the knowledge and resources of adult volunteers. Youth in 4-H programs build skills and competencies in science, healthy living, and civic engagement in a variety of settings included but not limited to 4-H clubs, camps and afterschool programs.

RCE 4-H faculty collaborate with research and extension experts from across Rutgers as well as other institutions to develop and disseminate research-based programs that promote youth development.

4-H programs are designed to help youth build critical life skills like independence, mastery, generosity and belonging. 4-H programs will continue to be available to youth throughout NJ, with significant outreach to disadvantaged youth in our urban areas. 4-H educators strive to reach underserved youth populations throughout the state, including children with disabilities and adjudicated youth, and develop programming to meet their needs.

In addition to traditional 4-H project areas like animal science and food & nutrition, youth can choose to focus on cutting-edge Science Technology, Engineering and Math (STEM) fields. The NJ 4-H program aims to provide youth access to STEM resources in their community for example, researchers who are willing to share their connection, knowledge, and enthusiasm for STEM as well as develop a program that is culturally responsive by connecting to problems that are central to the learner's community (e.g. climate change, local natural settings). 4-H programs continue to evolve with the interests, needs, and aspirations of the state's youth, offering traditional agricultural programs as well as contemporary STEM-based programs.

Science Emphasis Area

Agroclimate Science, Bioeconomy, Bioenergy, and Bioproducts, Education and Multicultural Alliances, Environmental Systems, Family & Consumer Sciences, Food Safety, Human Nutrition, Sustainable Agricultural Production Systems, Youth Development

Maintain Viable Agriculture and Aquaculture

Initiated on: Nov 26, 2019

State: New Jersey

Term Length: Long-term (>5 years)

Farmers and food producers everywhere deal with threats to their livelihoods posed by unfavorable weather, volatile market prices, high costs of production, and other conditions. These threats are exacerbated by global climate change. Aquaculture faces increasing sea levels and storms that threaten farms, access points, docks and working waterfronts as well as ocean acidification and rising temperatures in a crowded coastline filled with competing interests. New Jersey agriculture also operates in a densely populated, highly regulated, high land-value state. Many NJ farms are located on the urban-rural fringe; they are isolated islands of production located on expensive land in suburban locations. NJAES/RCE is committed to investigating novel ways to support all commercial growers, terrestrial and aquatic, while striving for economic and environmental sustainability, with integrated and multistate collaborations.

New Jersey currently has 9,883 farms and 734,000 acres of farmland. The total annual value of all agricultural products produced by our farms, including both plant and animal agriculture, is $1.1 billion. These farms are an important source of fresh produce and other food products for NJ residents and for the commercial food industry. Agriculture is a relatively small part of the state's overall economy but dominates the local economy in our southern counties. State agriculture also helps to feed the nation. NJ ranks 3rd among all 50 states in cranberry production, 4th in peach production, 5th in bell pepper production, and 5th in blueberry production.

Aquaculture, by comparison, is relatively small, but represents the fastest growing segment of food production in NJ and across the US. Fisheries by comparison are twice the value of agriculture with several of the largest fishing grounds located off the coast of NJ now threatened by offshore wind energy development. Nationally, NJ ranks in the top five states for both landings and value. If wind energy significantly curtails commercial fishing, what will replace that source of protein? Imports or aquaculture? A diversity of competing coastal interests both inshore and offshore stands to limit aquaculture growth and reduce fisheries production unless compatible, socially acceptable, and sustainable solutions are identified.

NJAES/RCE strives to develop vibrant value-added and direct marketing opportunities for growers through enhanced engagement with incubator programs; incorporate agriculture technology into production practices to increase efficiency and lower input use; develop/disseminate climate-smart agriculture information to improve environmental sustainability of agricultural operations; and demonstrate soil and water best management practices on NJAES farms as a resource for growers.

NJAES/RCE supports plant breeding programs for tree fruit, turfgrass, strawberries, cranberries, ornamental trees, tomatoes, peppers, basil, and hazelnuts. These programs produce new cultivars and varieties characterized by higher yields, better disease resistance, and enhanced quality products that are adapted to changing climate and new pest pressures. The development and implementation of integrated pest management strategies and timely pest advisories, issued through NJAES/RCE help farmers to detect and manage threats to their crops quickly and effectively. Helping NJ farmers identify and take advantage of new and emerging market opportunities, as well as identifying more cost-effective production practices, also support and sustain NJ agriculture. In a region where growing urbanization increasingly impinges on agricultural land-use and practices, NJ farmers face a panoply of regulations regarding agrarian land use, nutrient/waste management and disposal, water use, and other regulations and policies that affect their operations.

NJAES/RCE researchers and county agents keep abreast of these issues, developing and disseminating new methods and agricultural practices to adapt farm operations to the new regulations and reduce land use/cultural conflicts with neighboring non-agricultural neighbors. NJAES/RCE faculty and staff also develop strategies to improve the bottom line for farm operations. More cost-effective production methods, educational training resources for women and entry-level farmers, development of cost-effective technologies and operational processes for greenhouses, and identification of profitable niche market opportunities for NJ farmers are just some of the strategies that NJAES/RCE faculty and staff develop and disseminate.

Efforts to support agriculture extend beyond production and harvest. NJAES/RCE develops new packaging, value-added processing, treatment, and storage technologies that extend the post-harvest quality and shelf-life of produce and other farm products.

New Jersey's coastal waterways are an important source of food and an economic engine for local shore economies. NJAES continues to make strategic investments in the growth and culture of finfish and shellfish, as well as training and outreach on species of commercial and recreational importance to NJ. Much of NJ's aquaculture industry focuses on the culture and grow-out of two primary shellfish species, oysters and hard clams. These two species are a significant component of the state's coastal environment and economy, providing local, high-quality seafood that helps to attract tourists to the Jersey Shore. Disease-resistant stocks have been developed for the culture of eastern oysters within moderate-salinity estuaries. Superior stocks that survive and grow well in high-salinity water are needed to support oyster aquaculture in coastal bays.

An evolving challenge for shellfish stocks and associated habitat studied and communicated by NJAES/RCE is climate change. Shellfish habitat and population distributions are foreseeably altered in the future with coastal ecosystems already being reshaped by changing conditions such as sea level rise, severe and more frequent precipitation events that are expected to lead to greater freshwater inputs; and a northern shift of warmer waters which could lead to associated population shifts for species that cannot adapt to new environmental conditions.

New Jersey's farms are also an important source of non-food products, such as the turf and nursery/ landscaping products that enhance our environment. NJAES/RCE works closely with these industries to produce more attractive and resilient turfgrass and ornamental tree varieties, address current and emerging pest and pathogen threats, and develop and promote best practices for maintaining and enhancing landscapes.

Science Emphasis Area

Agroclimate Science, Bioeconomy, Bioenergy, and Bioproducts, Environmental Systems, Family & Consumer Sciences, Food Safety, Sustainable Agricultural Production Systems

Protect and Sustain Our Resources

Initiated on: Nov 26, 2019
State: New Jersey

Term Length: Long-term (>5 years)

Manmade and natural environmental factors affect water, soil, plant, and air quality, and the ability of various land and aquatic species to thrive and evolve, both ecologically and spatially. New Jersey researchers and extension agents develop an array of integrated programs designed to manage our at-risk natural resources sustainably. From performing ecofriendly remediation, planning, and conservation to conducting environmental assessment and analysis, NJAES/RCE strives to improve ecological quality, track patterns of animal development, health and behavior, increase nutrient use efficiency, implement alternative and renewable energy sources, use economic analysis to inform environmental policymakers, build resilience to weather variability, and develop best practices for land use.

Development patterns and population density place tremendous demands on New Jersey's ecosystems. Industrial and wastewater impacts on water quality, aging infrastructure, and regulations governing municipal stormwater and agricultural water use are some of the issues that confront NJ residents, farmers, and businesses. Integrated research and extension programs address water quality and quantity issues affecting New Jersey residents and businesses. Effective stormwater management via the use of green technology and other methods, agricultural best management practices, wastewater treatment, and watershed restoration are just a few strategies developed and implemented through NJAES/RCE. These research and extension priorities are of increasingly heightened importance in many communities because of climate change. Research continues the process and effectiveness of biodegradation as a treatment in the elimination of harmful contaminants in our waterways and wastewater. NJAES/RCE coordinates effective and efficient waste management and education programs that help stakeholders meet industry and state regulatory standards.

New Jersey's Atlantic and Delaware Bay coastlines are an important part of the state's economy. Its fishery/aquaculture industry is concentrated here, as is the bulk of the tourism industry. Changes in coastal water quality because of climatic changes, changes in watershed quality and management, and other events can have deleterious economic and ecological impacts on this important resource. New Jersey's coastline is also feeling the effect of rising sea levels and saltwater infiltration into freshwater aquifers and inland water systems because of climate change. NJAES researchers are using state-of-the-art technologies such as geospatial mapping, drones, and underwater gliders to gather the data needed to track and assess these developments. RCE faculty and staff develop educational and outreach programming in coastal water quality, watershed management, and ecological restoration in collaboration with watershed, recreational, marine trade, and other groups active in our coastal counties.

Other vital areas of NJAES research and extension efforts focus on protecting our natural resources. Examples include developing sources of renewable biofuel energy to decrease dependence on fossil fuels, finding solutions to problems that negatively impact pollinators, leading to adverse effects on crop health, tracking landscape changes in our state which are affected drastically by climate change, and studying animal behavior and welfare which in turn affects human health and food safety. Vital needs exist in the management of human-wildlife interactions, ranging from crop depredation to damages to residential property. Similarly, science-informed management of the impacts of New Jersey's built environment and climate conditions on the state's forested lands (in the context, for example, of wildlife habitat, ecosystem health, recreational uses, and environmental services) is an area of growing need as well.

Science Emphasis Area

Agroclimate Science, Bioeconomy, Bioenergy, and Bioproducts, Environmental Systems, Family & Consumer Sciences, Sustainable Agricultural Production Systems