



NEW JERSEY AGRICULTURAL EXPERIMENT STATION

ANNUAL REPORT | 2023

Catalyzing New Jersey for
a **Healthy** and **Sustainable**
Future



NJAES at Rutgers University–New Brunswick



The Rutgers New Jersey Agricultural Experiment Station (NJAES) is committed to stakeholder-informed, scientifically vetted research and outreach to address the critical concerns of communities and industry in New Jersey. Rutgers NJAES relies on strong connections with the public through our network of extension agents and the robust research, teaching, and outreach capacity of Rutgers University faculty, staff, and students.



Messages from Rutgers Leadership



PRESIDENT JONATHAN HOLLOWAY

Rutgers University–New Brunswick is the land-grant institution of New Jersey. With the charge to conduct research to be disseminated to the public, Rutgers NJAES engages with communities by listening to their needs, conducting applied research to solve their real-world problems, and delivering meaningful outreach and extension programs in a sustainable and substantive manner.



CHANCELLOR FRANCINE CONWAY

Rutgers University–New Brunswick is defining the future of higher education, guided by our Academic Master Plan and its Four Pillars of Excellence: Scholarly Leadership, Innovative Research, Student Success, and Community Engagement.

Rutgers NJAES plays a vital role in fulfilling that vision—especially by fostering interdisciplinary partnerships across our Rutgers–New Brunswick schools and bringing the transformative power of our education, research, and service to the people who need it most.

amp.rutgers.edu



EXECUTIVE DIRECTOR/EXECUTIVE DEAN LAURA LAWSON

Rutgers NJAES's mission is to enhance the vitality, health, sustainability, and overall quality of life in New Jersey by developing and delivering practical, effective solutions to current and emerging challenges related to the environment, agriculture and food, community and individual health, and youth development. Our work bears fruit when we engage in meaningful, innovative research that engages stakeholders, colleagues from across disciplines, and students. By doing so, we support diverse, scholarly communities that are committed to serving the public good. With the people, skills, resources, and cutting-edge tools in hand, Rutgers NJAES is well-positioned to meet the needs of the state of New Jersey for a healthy and sustainable future.

This 2023 Annual Report highlights examples of Rutgers NJAES programming that catalyzes New Jersey for a healthy and sustainable future.

**21,602
PARTICIPANTS**

IN OFFICE OF CONTINUING PROFESSIONAL
EDUCATION CERTIFICATION PROGRAMS



\$8M
**ROYALTIES GENERATED
BY RUTGERS NJAES
INNOVATIONS AND LICENSING**

**17,293
4-H
YOUTH
PARTICIPANTS**

**3,800
COMPANIES**
SUPPORTED BY
RUTGERS NJAES
BUSINESS
INCUBATORS TO DATE

\$41.3M
**FEDERAL GRANTS AND
CONTRACTS FUNDING RECEIVED**
RUTGERS NJAES AND SEBS



9,200
**SOIL TESTING AND PLANT
PATHOLOGY SERVICES
PROVIDED**



31,723
PEOPLE SERVED BY
RUTGERS COOPERATIVE EXTENSION HEALTH
AND NUTRITION EDUCATION PROGRAMS

Building a Climate-Resilient New Jersey

With ever-changing environmental conditions and more extreme weather events anticipated, Rutgers NJAES is working with communities and industry to develop the tools to ensure a sustainable future.

RESTORING FLOODPLAINS

Due to climate change, severe weather events are occurring more often, increasing the risk of flooding in coastal regions. After Superstorm Sandy, the New Jersey Department of Environmental Protection applied funds from the Blue Acres program to purchase and clear out flood-prone properties in areas affected by the storm, including sections of Woodbridge Township. The Rutgers NJAES Wildlife Conservation and Management Program then converted these areas into functional ecosystems, and now are working to create floodplain management plans. wildlife.rutgers.edu



EQUITABLY SUPPLYING THE OFFSHORE WIND ENERGY INDUSTRY

Through the *WindIgnite* accelerator program, Rutgers NJAES supports small businesses and start-ups involved in the offshore wind energy supply chain in New Jersey and the Mid-Atlantic

region. *WindIgnite* is committed to social equity, and purposefully includes enterprises with historically unequal participation in the innovation pathway, especially those owned by women and people of color. Such businesses gain access to programs to accelerate business growth, including informative networking events, business development guidance, specialized training, and connection to resources and business opportunities within the region. Events this year included an “Idea Design Lab” to assess innovation opportunities in offshore wind ecosystems, and an “Offshore Wind Industry Awareness Event” in collaboration with the New Jersey Association of Women Business Owners. By hosting events like these, *WindIgnite* helps new and existing companies progress through the innovation pathway from discovery to commercialization. windignite.rutgers.edu

STUDYING LIVING RESOURCES FOR OFFSHORE WIND ENERGY

Water habitats can change, not only due to natural occurrences such as storms, water currents, and seasonal differences, but also due to man-made structures associated with offshore wind energy turbines. Through the Rutgers offshore wind living resource studies research program, scientists are exploring how the proposed turbines affect living resources such as fish, shellfish, and marine mammals. This research will help the offshore wind energy industry develop ways to co-exist with the environment. rowlrs.marine.rutgers.edu



THE NEWEST HARVEST ON FARMS: SOLAR ENERGY

Working towards the State of New Jersey’s goal of 100% renewable energy by 2050, the “agrivoltaics” program tests the use of farmland for the dual purposes of agriculture and solar energy generation. Dual-use solar energy systems for research and demonstration were installed in various configurations at the research farms in New Brunswick, Bridgeton, and Pittstown. The program will provide recommendations to farmers, solar panel developers, and policymakers about the construction of hybrid farmland/solar energy sites to maximize agricultural and clean energy production.

ecocomplex.rutgers.edu/agrivoltaics-research.html

Empowering Communities with Sustainable Practices

Rutgers NJAES delivers safe, culturally-aware sustainability programs directly to areas that need it the most.

CREATING GREEN SOLUTIONS FOR COMMUNITY WATER CHALLENGES

Improper management of stormwater can lead to flooding and water quality issues. Through the Green Infrastructure Champions Certification Program, the Rutgers Cooperative Extension Water Resources Program trains participants from local communities on how to construct green infrastructure projects such as rain gardens, identify potential project sites, and gather partners and funds to support these projects. By participating, the Champions develop the skills required to prepare stormwater management plans that promote climate resiliency. water.rutgers.edu



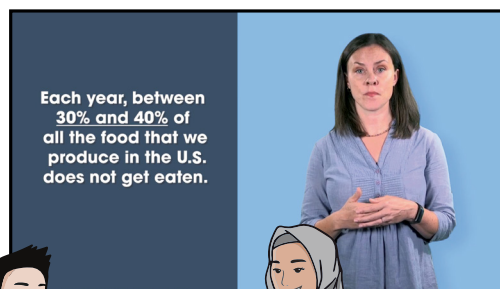
CULTIVATING URBAN AGRICULTURE ACROSS THE STATE

As the most densely populated state, New Jersey needs green space where residents can grow their own food, especially in disadvantaged communities lacking affordable grocery stores. The Rutgers NJAES Office of Urban Extension and Engagement met with growers across New Jersey's rural to urban landscape to better understand their needs, and prepared a report and website to help define, engage, educate, and fund urban and suburban farming. urbanag.rutgers.edu



PROTECTING THE PLANET WITH YOUR PLATE

According to the World Health Organization, one of the top threats to global health is climate change. To address this, the Rutgers Cooperative Extension Food Waste Team developed the "New Jersey Leaves No Bite Behind" and the "People, Plants, and the Planet" programs as part of a comprehensive school food waste reduction initiative. These programs aim to reduce food waste and increase plant-based eating habits through an engaging curriculum for 5th grade students that is aligned with the recently adopted New Jersey Climate Change Standards. As part of the programs, students conduct games and activities that encourage food waste reduction and plant-based eating while gaining a better understanding of climate change. Games such as the "Food Miles – Shrinking Our Food's Carbon Footprint" and "Food Waste Impacts and Solutions," along with the installation and use of composters, make the curriculum exciting for the schools involved. go.rutgers.edu/wvn5p7kc



LOCALIZING THE FOOD SUPPLY

With over 650,000 individuals in New Jersey being food insecure, farmers markets and community gardens are helpful in encouraging residents to eat and grow local, healthy food. The New Brunswick Community Farmers Market and the Cook's Market at Rutgers Gardens operate during the growing season and encourage healthy eating through nutritional demonstrations and recipe cards. For those who would like to grow their own produce, community gardens are available at the "Jardin de Esperanza" and the Cook Organic Gardens in partnership with Global Grace Farms. nbcfarmersmarket.com



Catalyzing Innovation for a Viable Agricultural Industry

Investment in state-of-the-art equipment enables Rutgers NJAES faculty and staff to conduct innovative research that generates new plant varieties and demonstrates new technologies that improve farm profitability.

ADOPTING AI FOR AGRICULTURE

Faculty, staff, and students from Rutgers NJAES, the School of Environmental and Biological Sciences, and the School of Engineering are collaborating with Rowan University and Atlantic Cape Community College to combine computer vision with plant biology to create new, paradigm-shifting approaches to quantitatively evaluate plant health with imagery data. By developing cutting-edge algorithms via machine learning methods and artificial intelligence (AI) on datasets collected using multi-spectral drones, researchers are looking at cranberries and blueberries in a new way. Students are engaged in the data collection and applications aspects of the project and receive training in the use of drones for research purposes. The team is also working together to expand this technology to more crops.

go.rutgers.edu/ex9v3vm0



IMPROVING GRASSES FOR CLIMATE ADAPTATION

Turfgrass faces stresses from drought, heat, salt, disease, and insects, not to mention the wear and tear associated with sports and recreational uses. Due to a changing climate, there is also a migration of warm-season grasses northward. To address these stresses and changes, the Rutgers NJAES Center for Turfgrass Science is working with golf courses to study the use and maintenance of warm-season grasses such as zoysiagrass and bermudagrass to see if they would be a favorable replacement to creeping bentgrass that is typically used. In addition to studying the golf courses' turfgrass management, a perception survey of golfers is being conducted to better understand their preferences. turf.rutgers.edu



BREEDING RESILIENT PLANT VARIETIES

With a changing climate, having crops that can resist disease and pests while also being nutritious and flavorful is necessary. To accomplish this, the Rutgers New Use Agriculture and Natural Plant Products Program conducts cutting-edge science by developing new crop production, processing, and product standardization while identifying new bioactive compounds that are of potential health or commercial interest. The program is working on innovations for crops like hops, basil, grape, exotic pepper, catnip, and African indigenous vegetables. The basil, which was bred to be resistant to downy mildew, received accolades like the prestigious Edison Patent Award and was featured in the film *Fields of Devotion*.

newuseag.rutgers.edu



ENHANCING FARM VIABILITY

New Jersey's agricultural industry faces many challenges, including rising input costs, market access, labor and land costs, and regulatory issues. Rutgers NJAES researchers are leading a statewide farm viability initiative to strengthen agricultural retention and economic development efforts. Central to these efforts are the identification of programs and coordination of agency and educational resources to support farmer-identified needs in areas related to farm management, succession planning, new technology adoption, marketing, resource conservation, and climate resilience, among others.



Developing the Workforce of Today to Meet the Needs of Tomorrow

To ensure New Jersey is well-positioned for growth, it needs a highly skilled workforce and opportunities for lifelong learning.

INSPIRING YOUNG STEM LEADERS

The Rutgers 4-H Science, Technology, Engineering, and Mathematics (STEM) program connects youth in grades 5-8 with Rutgers University faculty and their research. Last year, the program developed an “Explorers of the Deep 4-H STEM Challenge” kit in collaboration with Rutgers oceanographers and educators. The kit includes a test tank in which students can prepare an ocean robot for a research mission, practice operating it, and evaluate data collected by real ocean robots. Students also learn about the ocean ecosystem while navigating an ocean robot around the world in an ocean expedition board game. Through the kit’s “Ocean Communicator” activity, students discover the challenges ocean scientists and engineers are addressing, and develop solutions to inspire public action. The 4-H STEM program also hosts regular on-campus events, such as “Rutgerscience Saturdays” and “4-H Adventures,” where youth can experience Rutgers research hands-on. These activities are advancing the program’s mission to inspire young people to get involved in STEM.

4hset.rutgers.edu



STEWARDED SOLUTIONS FOR ENVIRONMENTAL ISSUES

The changing climate disproportionately affects the northeastern United States, including the ecologically diverse state of New Jersey. Citizens involved in local zoning and planning boards make important decisions that affect how natural resources in the state are used. Therefore, a well-informed citizenry is needed to protect New Jersey’s native wildlife and habitats, as well as its infrastructure, public health, and economy. Rutgers NJAES developed the Rutgers Environmental Stewards Certificate Program to teach residents about local and global environmental issues so they are equipped to solve them. Through the program, participants learn about not only climate change, but also the ecology, land-use ordinances, and environmental regulations of New Jersey to prepare them to influence policies, implement environmentally friendly practices, and teach others. Participants practice their learning by completing a project in their own community. This program gives residents the foundational knowledge and experience they will need to enhance their communities in the face of climate change. envirostewards.rutgers.edu



GROWING THE NEXT GENERATION OF FARMERS

To address the need to recruit and train the next generation of farmers in New Jersey, the RU Ready to Farm Beginner Farmer Training

Program provides interdisciplinary, experiential learning to novice farmers while seasoned farmers share their experiences.

Basic farming online training is conducted followed by hands-on training. Participants then run a community-supported agriculture (CSA) operation, where they learn business, marketing, and planning skills. rubeginnerfarmer.rutgers.edu



DEVELOPING WORKFORCE SKILLS FOR FUTURE SUCCESS

New Jersey’s workforce needs the skills and knowledge to grow their careers. By leveraging the wealth of knowledge available at Rutgers, the Rutgers NJAES Office of Continuing Professional Education develops courses that meet the needs of students and professionals wanting to grow their education. For example, as part of the Wetlands Delineation Certificate program, students are taught how to delineate wetlands through practical field training while learning the applicable regulations.

cpe.rutgers.edu





Time to Roll Up Your Sleeves!

Join Rutgers NJAES in getting involved across the state! Volunteers are welcome to participate in the many exciting programs being offered. There's something for everyone! njaes.rutgers.edu/volunteer

We have the state covered!

-  Rutgers NJAES Off-Campus Research and Extension Centers
-  1 Clifford E. & Melda C. Snyder Research and Extension Farm
-  2 Haskin Shellfish Research Laboratory
-  3 Jacques Cousteau Coastal Center
-  4 Lindley G. Cook 4-H Youth Center for Outdoor Education
-  5 New Jersey Aquaculture Innovation Center
-  6 Philip E. Marucci Center for Blueberry and Cranberry Research and Extension
-  7 Rutgers Agricultural Research and Extension Center
-  8 Rutgers Cape Shore Laboratory
-  9 Rutgers EcoComplex - Clean Energy Innovation Center
-  10 Rutgers Food Innovation Center
-  11 Rutgers University Marine Field Station
-  12 Rutgers Plant Science Research and Extension Farm
-  13 Rutgers Specialty Crop Research and Extension Center
-  14 Sandy Hook Cooperative Research Program

 County Cooperative Extension Offices

 New Brunswick-Based Rutgers NJAES Centers, Institutes, and Programs

- Animal Care Program
- Center for Environmental Prediction
- Center for Ocean Observing Leadership
- Center for Turfgrass Science
- Center for Urban Environmental Sustainability
- Center for Vector Biology
- Chrysler Herbarium
- Equine Science Center
- Grant F. Walton Center for Remote Sensing and Spatial Analysis
- Hutcheson Memorial Forest (off-campus)
- Horticultural Farm I & III (off-campus)
- Horticultural Farm II (off-campus)
- New Jersey Institute for Food, Nutrition, and Health
- New Jersey Water Resources Research Institute
- Office of Continuing Professional Education
- Plant Diagnostic Laboratory and Nematode Detection Service
- Rutgers Climate and Energy Institute
- Rutgers Ecological Preserve (off-campus)
- Rutgers Gardens (off-campus)
- Soil Testing Laboratory

