

RUTGERS

New Jersey Agricultural
Experiment Station



2012 Annual Report

New Jersey
Agricultural
Experiment
Station



Our Mission

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 relating to agriculture; fisheries; food; natural resources; the environment; public health; as well as economic, community, and youth development.

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Jersey Roots, Global Reach

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We Have the State Covered

Reaching all 21 New Jersey counties:

Rutgers Cooperative Extension Statistics

173,864 participants in educational outreach	20,942 one-on-one visits to homes, farms, fields, and industries	5,810 youth and 2,515 adult EFNEP participants reached in behaviorally focused nutrition education classes
2,251 volunteers trained	2,072 issues of various newsletters with a circulation of 65,781	51,696 youth and 4,351 adult SNAP-Ed participants reached in behaviorally focused nutrition education classes
2,452 programs conducted	3,981,708 website page views	
48,526 4-H Youth Development program participants	1,338,403 website visits	
2,660 4-H volunteers		
2,418 active Rutgers Master Gardener volunteers		

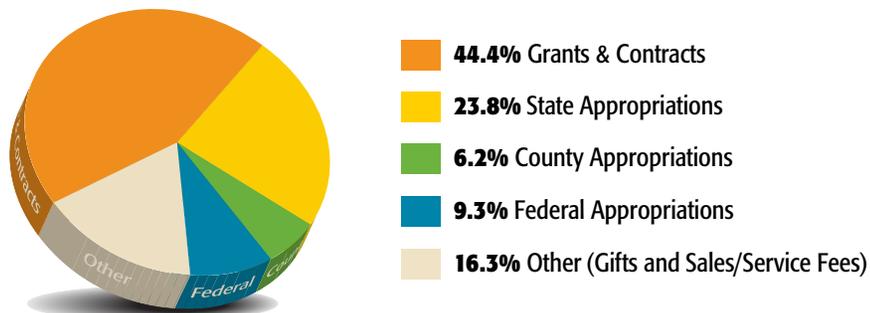
NJAES plays a significant role in the state's economic growth by:

- Funding cutting-edge, innovative research
- Fostering technology and innovation transfer to industry
- Launching start-up enterprises through incubators and business development support
- Providing a well-educated, highly skilled workforce
- Developing sustainable growth strategies for urban and rural communities

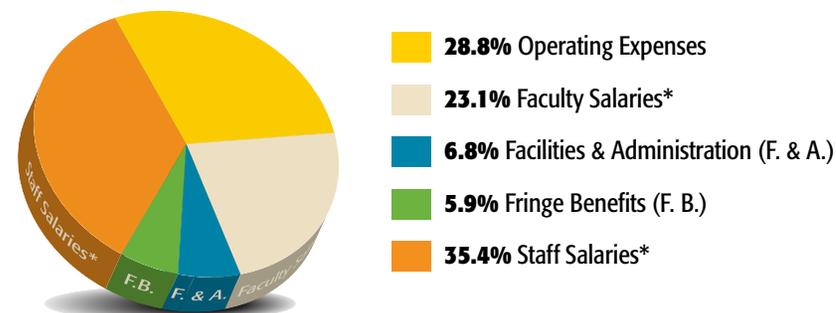




Funding Sources



Expenditure Breakdown



* Includes in-kind salaries paid by counties to Rutgers Cooperative Extension faculty and staff.

** Facilities and Administration Costs (F. & A.) were previously referred to as Indirect Costs. These are costs that are incurred for common or joint objectives and therefore cannot be identified readily and specifically with a particular sponsored project, instructional activity, or any other institutional activity. Facilities costs include building and equipment depreciation, operation and maintenance expenses, and interest on debt and library expenses. Administration costs include general administration and general expenses, departmental administration, sponsored projects administration, and student administration and services.

Base funding from the State of New Jersey and from USDA-NIFA formula funds provides NJAES with a foundation for program development and delivery, while competitive grants, contracts, and gifts increase the scope and impact of research and education programs.

The state appropriation for 2012 totaled \$21.742 million, remaining unchanged from FY11. "Other" funding includes restricted and unrestricted gifts, income from sales and service activities, and patent and plant licensing income. County appropriations include salaries paid by counties to Rutgers Cooperative Extension (RCE) faculty and staff. We gratefully acknowledge the personnel, facilities, and other support that each county provides to Rutgers Cooperative Extension.

NJAES expended a total of \$91.7 million to support research and extension activities in 2012; this represents a 5% increase in spending over FY11. State appropriations supported 23.8% of FY12 expenses, compared to 25.0% in 2011, continuing the trend of a declining role of state support for NJAES activity. Increased funding from grants and contracts allowed NJAES to maintain research and extension programs. Grant income is the primary source of support for our nutritional assistance programs, national pesticide testing and pest management services, and continuing professional education programs for New Jersey's farmers, businesses, and residents. About 38% of grant-funded expenditures in FY12 came from awards to the Supplemental Nutrition Assistance Program-Education (SNAP-Ed/Extension), the IR-4 program, and the Office of Continuing Professional Education. Grant income in FY12 also supported horticultural, plant breeding, and plant pathology research; international cooperative efforts in agricultural innovation and research on climate change, water quality, and other environmental issues; innovations in food processing; and advances in food safety. Together, these activities accounted for another 29% of all grant-funded expenses.



Ventimiglia Family Farm Winery in Wantage Twp.
in Sussex County, NJ.

Commercial Agriculture

Putting New Jersey Vintages on the Map

In 2012, the annual meeting of the American Association of Wine Economists (AAWE) was held in Princeton, NJ, and, as is customary, the local wine industry was a particular focus at the meeting. The session on local viticulture featured Dan Ward, extension specialist in tree fruit and small fruit, including wine grapes, who presented “A Viticultural Map of New Jersey,” providing an overview of vineyard and winery locations, grape varieties being cultivated, soil and climatic conditions, and the viticultural map of recommended growing areas. Also at the conference, a special wine tasting was organized comparing select New Jersey wines with fine wines from Bordeaux, France. The tasting was modeled on the groundbreaking 1976 tasting, “The Judgment of Paris,” in which two California wines came out on top and inspired both a book by

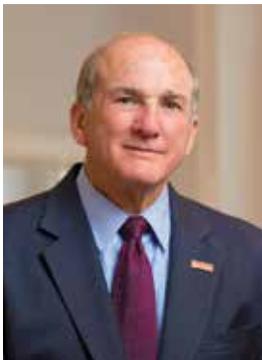
famed TIME reporter George Taber titled *Judgment of Paris: California vs. France and the Historic 1976 Paris Tasting That Revolutionized Wine* and a Hollywood movie by Randall Miller titled *Bottle Shock*. The tasting at the AAWE conference was dubbed the “The Judgment of Princeton” and was organized with help from Taber, a participant in the original 1976 wine tasting. New Jersey wines were generally rated as well as the fine Bordeaux wines that can cost significantly more. The findings are part of establishing an identity for New Jersey as a world-class wine region. The results of the tasting are being widely publicized and will be featured in an upcoming issue of the *Journal of Wine Economics*, which will include a graphical and statistical analysis of the tasting by Ward.





Strengthening Pest Management Strategies

The spotted wing drosophila (SWD), a recent invasive pest in the U.S., has threatened berry crops like strawberries and blueberries, as well as cherries, peaches, and wine and table grapes, disrupting established IPM practices in these crops. SWD, along with the brown marmorated stink bug (BMSB), another invasive insect, have posed severe challenges for fruit growers in several states, including New Jersey where the NJAES Fruit IPM Program refocused its efforts towards more intense control tactics. Dean Polk, fruit IPM coordinator, and Cesar Rodriguez-Saona, extension specialist in entomology, conduct robust monitoring of traps placed in peach orchards, blueberry fields, and vineyards. NJAES also provides research to the New Jersey fruit industry and has expanded collaboration with other states. For its contributions to New Jersey agriculture, NJAES' Fruit IPM program was presented "The Distinguished Service to New Jersey Agriculture" award by the New Jersey Farm Bureau. Anne Nielsen, Rutgers specialist in entomology, was awarded a USDA-NIFA grant to develop whole-farm organic management of the BMSB. Rutgers partners with various institutions in this multi-state collaboration, which will help growers select and plan trap crops, enhance natural enemies, implement cultural control, and identify movement patterns. The appearance of boxwood blight, which is prevalent in Europe, was first reported last year by several states in the U.S. Boxwood blight damages foliage, leading to defoliated and weakened plants. The IR-4 Ornamental Horticulture Program is collaborating with researchers from other states and USDA-ARS to build on the limited European data, tailoring the research priorities to benefit U.S. growers.



Robert L. Barchi
Rutgers University President

From natural resources management to nutrition, 4-H to fisheries restoration, the excellence and statewide reach of NJAES are critical to Rutgers' role as the State University of New Jersey. Indeed, NJAES can be a model as Rutgers expands its presence and impact with the addition of medical and dental education to its mission this year.

Did you know?

In 2012, NJ's farmland preservation program enrolled its 200,000th acre, leading the nation with 27% preserved.



Top: Boxwood blight. **Bottom:** While Spotted Wing Drosophila is a threat to fruits such as strawberries, raspberries, and blackberries; in New Jersey, blueberry crops are most at risk.



Commercial Agriculture

Celebrating NJAES Plant Breeding

Rutgers NJAES plant breeding products quite literally have *Jersey Roots, Global Reach*. Varieties bred in the Garden State that benefit New Jersey growers and gardeners have also gained worldwide use and, in instances, led the industry as in the case of the all-male asparagus hybrids. From the groundbreaking 1934 release of the Rutgers tomato, which was the leading processing variety in the world for some time, to the latest innovations in energy grasses for biofuels, plant breeding at Rutgers has been highly successful and has had a great impact on agriculture in New Jersey. The range of plants developed through NJAES breeding programs include asparagus; basil; blueberry; cranberry; strawberries; tree fruit (peaches, nectarines, apples, apricots, beach plums); dogwood; holly; turf and energy grasses; hazelnut; tomatoes; and ethnic vegetables. Over the years the NJAES breeding program has gained significant recognition and 2012 was no exception, earning two statewide honors. Famed plant breeder Elwin Orton, professor emeritus of plant biology and pathology, was inducted into the New Jersey Inventors Hall of Fame. He was credited with “saving the U.S. dogwood industry” with new cultivars of hardy, disease- and pest-resistant hybrid dogwoods at a time when diseases and insects threatened the native species of the popular flowering tree. Orton has earned many patents for new cultivars of dogwoods and holly that he developed over his four-decade career. In recognition of their contributions to New Jersey agriculture for the patent of the “NJ953” male asparagus hybrid, the Rutgers breeding team of Chee-kok Chin, Steve Garrison, and John Kinelski was selected as a 2012 Patent Award Winner by the Research & Development Council of New Jersey. The NJAES asparagus breeding program has produced several high-yielding varieties that grow in both warm and cool climates, are resistant to disease, and have very good spear quality.

Spears emerging in a field of Rutgers NJAES all-male hybrid asparagus.



Organic weed control training at Rutgers' Snyder Farm.

Enhancing Weed Science Skills

On July 24, the Rutgers Clifford E. and Melda C. Snyder Research and Extension Farm in Pittstown, NJ, hosted the 2012 Northeastern Weed Science Society Collegiate Weed Science Contest, an intense, one-day competition designed to enhance the classroom experience of students by broadening their applied skills in weed science. More than 65 graduate and undergraduate students from eight universities, including Cornell, North Carolina State, Ohio State, Penn State, the University of Kentucky, the University of Tennessee, Virginia Tech, and the University of Guelph, Canada, participated in this year's contest. Participating schools field both undergraduate and graduate teams, which must identify scores of weed species by their common and Latin names. A critical component of the competition required familiarity with crop and weed injury

caused by a wide range of herbicides. Participants were judged on their skills to accurately calibrate pesticide sprayers to better assist farmers. Contestants were also faced with real-world scenarios experienced by weed scientists and farmers, and were required to demonstrate problem-solving skills that can make a difference between getting a crop to market or a disastrous harvest. Judging the skills of the competitors fell to representatives of the Northeastern Weed Science Society as well as organizers of the contest. This year a program sponsored by the USDA and the Northeast Sustainable Agriculture Research and Education Grant was added for students to enhance their knowledge of organic weed control. Students were instructed on various skills, including hand and tractor cultivating, flaming, and organic herbicides.





Left: Brown bat tagged for White Nose Syndrome study at the New Jersey Bat Sanctuary in Alexandria Twp., NJ. **Right:** Wildlife specialist Brooke Maslo.

Environment and Natural Resources

Preserving Species Beneficial to Agriculture

In the agricultural industry, pest control is never static, as new threats develop, leaving established integrated pest management (IPM) strategies disrupted for lack of effective controls. Conventional controls can sometimes harm beneficial insect populations, human health, wildlife, or the environment. An ecological approach to agricultural practices offers innovative ways of improving farm production while increasing sustainability. Methods to conserve natural enemies of pests in agroecosystems can promote compatible agricultural practices and biological control measures. Rutgers entomologist Cesar Rodriguez-Saona is investigating the use of lures baited with the plant volatile methyl salicylate (MeSA) to conserve natural predators of cranberry pests. His work has shown that insect predators are broadly attracted to MeSA lures and their use can enhance biological control on farms and reduce pest pressure. The brown marmorated stink bug (BMSB), which threatens a

wide range of crops, as yet has no effective IPM control. Rutgers' new wildlife specialist Brooke Maslo was awarded a USDA-NRCS Conservation Innovation Grant to study how bats might help to combat BMSB. The study, which analyzes DNA of insect fragments in bat droppings, will determine if bats consume stink bugs and other pests in quantities that are sufficient to reduce the pest management costs for apple and peach producers. Diminishing populations of honey bees due to Colony Collapse Disorder result in insufficient crop pollination, with the resulting impact on agriculture in the costs of production and the variety of food we eat. Professor Rachel Winfree, pollination ecologist, is conducting research on the beneficial role of native pollinators in three New Jersey crops—blueberries, cranberries, and watermelon.



njaes.rutgers.edu/environment



Managing Water Resources

Rutgers Cooperative Extension (RCE) agents work extensively with the New Jersey Agricultural Water Certification program that regulates farm irrigation. Recognizing the importance of maintaining water quality and finding optimal water utilization in a high-value agricultural state like New Jersey, RCE of Burlington County led the second annual Agricultural Water Summit on March 21 for farmers to discuss water quality degradation, utilization of available water resources, and the state regulatory environment. Rutgers leadership in other water initiatives earned RCE of Essex County an “Honorable Mention” in the Healthy and Sustainable Communities Category in the 2011 Governor’s Environmental Excellence Awards end-of-year ceremony for its Sustainable Landscape and Stormwater Management green job skills training program at the East Orange Veterans Affairs Hospital. The program, a partnership among RCE, the Planetree Corporation, and the Veteran Affairs New Jersey Health Care system, trains unemployed New Jersey veterans through a green job skills program focused on sustainable landscaping and stormwater management. This was the fifth year in succession, and sixth overall, that RCE has been recognized by the Governor’s Environmental Excellence Awards, which honors individuals, organizations, institutions, communities, and businesses that have made significant contributions in protecting New Jersey’s environment. The Rutgers Water Resources Program, a part of the New England Rain Garden Training Team, was honored on April 25 with an Environmental Merit Award by the New England Office of the U.S. Environmental Protection Agency, Region 1.

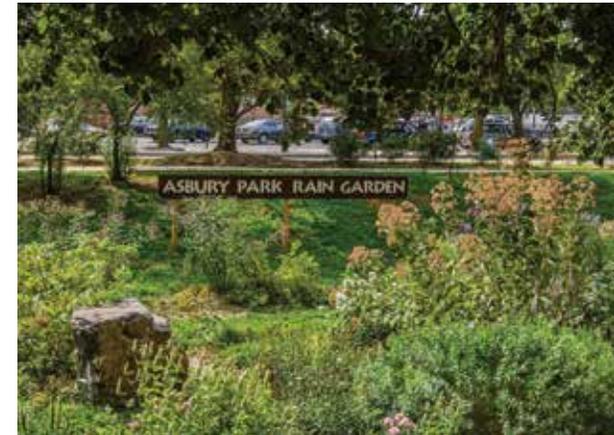


Robert M. Goodman
Executive Director of NJAES

In 2012, Rutgers celebrated the passage of the Morrill Act of 1862; this act created at least one institution in each state that received a federal land-grant to fund education in the liberal arts, agriculture, and the mechanic arts. Today, 150 years later, Rutgers remains committed to disseminating practical knowledge and being relevant to the wellbeing of the people it serves.

Did you know?

Bats eat insects like beetles, stink bugs, leafhoppers, and corn earworm (moths) that damage crops.



Top: Rain Garden in Asbury Park, NJ. **Bottom:** Center pivot irrigation with low-pressure drop sprinkler heads is an efficient irrigation method for large acreage.



Environment and Natural Resources

Sustaining Biodiversity at Duke Farms

Duke Farms, located in Hillsborough, in Somerset County, has evolved from the private estate of the Duke family into a 2,700-acre Center for Land Stewardship, whose mission is to help the region improve its environmental health by adopting the best ecological practices available. The Rutgers Center for Urban Restoration Ecology (CURE), led by ecology professor Steven Handel, is collaborating with Duke Farms to encourage New Jersey residents to improve their environmental and economic conditions. This collaboration advances ecological research in which students and staff design experiments to improve the sustainable biodiversity of our area, including testing new hybrid varieties of the American chestnut tree to see which are most resistant to the disease that almost led to the chestnut's extinction from North America. In addition, testing is underway to find new ways to reintroduce native species on former mowed and farmed land to increase ecological health. Novel approaches are also being employed to inhibit the spread of many invasive species from other continents that are damaging woodlands and wetlands. Outreach to communicate the best ecological practices are being advanced using modern technology. Visitors to Duke Farms can listen during their walks to cell phone messages explaining the importance of healthy native habitats for our communities. The Rutgers team, led by Christina Kaunzinger, senior ecologist at CURE, has also helped produce the materials available at the new Orientation Center and posted on the educational panels throughout the grounds. A series of programs for local government workers and private land managers to spread the lessons learned at Duke Farms to decision-makers in the area is also being organized.



Experiments investigate whether our native bluebell, pictured here at Duke Farms, can stop the spread of an invasive buttercup.

Equine waste management at Rutgers' Ryders Lane Farm on the New Brunswick Campus.

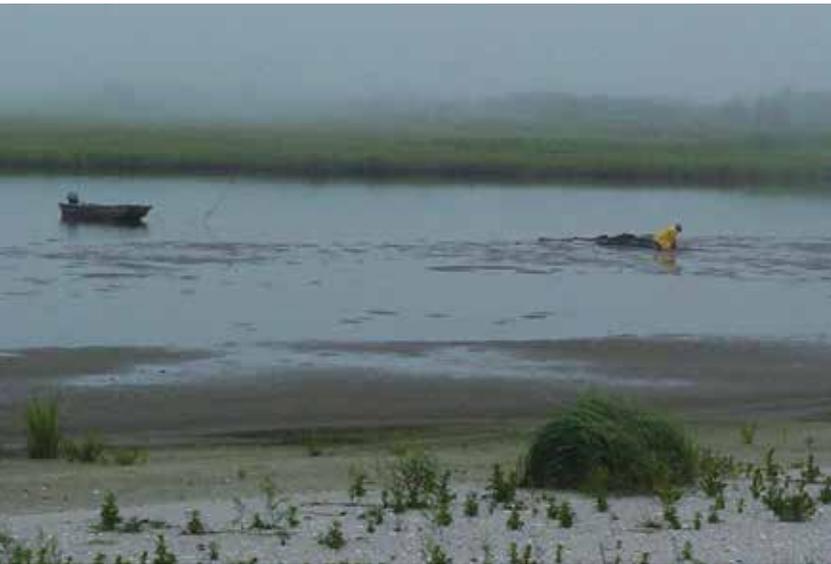


Managing Animal Waste

The New Jersey Department of Agriculture adopted regulations in 2009 that require livestock farm owners to manage the manure generated by their operations. New Jersey livestock farmers were required to be in compliance with these regulations by 2012. The Rutgers Equine Science Center (ESC) has been on the forefront of research on best management practices of livestock waste disposal. Studies have investigated whether rations high in phosphorus and/or nitrogen can harm water quality. An ongoing challenge for small horse farms is manure and bedding accumulating in large piles. Runoff from farms that gets into waterways poses a risk to water quality if manure piles are located near paved surfaces, drainage, creeks, or streams. Many horse farms address this by composting the manure,

which produces a good source of organic matter for gardens and farms. The ESC is conducting composting research that compares methods and biodegradable properties of different bedding materials to help find practical and low-cost options for manure management. In 2012, a pilot project using anaerobic digestion on a horse farm was launched in Monmouth County. Anaerobic digestion breaks down organic matter in a digester unit and produces methane gas. The gas is captured and cleaned, and can be used to power a generator or boiler to heat water to produce steam. This project involves the Rutgers Department of Animal Sciences and is funded by a conservation innovation grant from the USDA-Natural Resources Conservation Service.





Left: Collecting samples in Barnegat Bay.

Right: Professor Michael Kennish.

Fisheries and Aquaculture

Assessing the Health of Barnegat Bay

Rutgers plays a critical role in environmental protection of estuarine and marine waters in New Jersey. Michael Kennish, research professor and marine scientist, Benjamin Fertig, postdoctoral research associate, and Richard Lathrop, professor of environmental monitoring have compiled and analyzed more than 20 years of physical, chemical, and biotic data on the Barnegat Bay-Little Egg Harbor Estuary. Their research has been compiled in an innovative and quantitative “Index of Eutrophication” that will serve as a powerful tool for coastal managers to assess ecosystem conditions and determine the measures necessary to remediate environmental impacts, particularly those related to nutrient enrichment. Most notably, the index gives an accurate measure of eutrophic impact on the estuary and a method to quantify its status and trends for long-term, effective ecosystem management. This investigation is part of a multi-

year, interdisciplinary research effort by Rutgers and the U.S. Geological Survey that characterizes and quantifies the estuary with regard to watershed nutrient inputs, physical and water quality properties, and biological indicators and responses. Prior to this comprehensive investigation of data going back 20 years, no validated, quantitative biotic index had been produced to assess the ecosystem health of estuarine waters of New Jersey. An important goal for the future is to extend this type of ecosystem assessment to all estuarine waters in New Jersey in order to protect biotic communities, recreational and commercial fisheries, water quality, and habitats. This valuable research has far-reaching implications for coastal environmental protection, fisheries and habitat sustainability, and human use in New Jersey and other coastal states.

njaes.rutgers.edu/fisheries



Did you know?

NJ clam farmers work their clam beds all winter long, ensuring a fresh, year-round bounty of *Jersey Seafood*.

Shellfisheries Award for Lifetime Achievement

Longtime Rutgers colleagues Susan Ford, professor emeritus of marine and coastal sciences, and John Kraeuter, recently retired associate director of the Haskin Shellfish Research Laboratory, were inducted as Honored Life Members of the National Shellfisheries Association (NSA) for their contributions to the fields of shellfish biology, ecology, physiology, pathology, aquaculture, and fisheries. Ford's recognition by NSA dates to 1971 when she won the Thurlow C. Nelson Award for "MSX-10 years in the Lower Delaware Bay," becoming the fifth recipient and the first woman, to win that award. Ford has been appointed to the editorial board of several journals during her career, including the *Journal of Shellfish Research*, *Diseases of Aquatic Organisms* and the *Journal of Invertebrate Pathology*. Ford, highly sought after as an expert on national and international review panels, is the only U.S. representative on the International Council for the Exploration of the Sea's Working Group on Pathology and Diseases of Marine Organisms. Kraeuter is an estuarine ecologist, well-respected nationally and internationally for his work on shellfish, particularly hard clams (eastern quahogs). He developed an outstanding reputation among colleagues worldwide for his work with NSA past president and honored life member Mike Castagna from the Virginia Institute of Marine Science's Eastern Shore Laboratory. Kraeuter and Castagna perfected hard clam aquaculture methods and produced the "Manual for growing the hard clam, *Mercenaria*," a publication considered the bible for hard clam aquaculturists and subsequently the "Biology of the Hard Clam," a definitive scientific reference.



Douglas H. Fisher
New Jersey Secretary of Agriculture

With \$1.12 billion in agricultural sales and more than 100 different crops grown in the state, NJAES is an important partner in ensuring continued growth of New Jersey's agriculture industry. Through both research and extension, the dedicated and talented professionals at NJAES provide vital and critical services on which our farmers have come to depend.

Top: L-R: Susan Ford; LeRoy Creswell, president of the National Shellfisheries Association; and John Kraeuter at the 104th NSA luncheon in WA. **Bottom:** Barnegat Bay seed clams at a community-based demonstration project funded by an aquaculture restoration grant.



Fisheries and Aquaculture

Inaugural Community Supported Seafood Project

Community supported fisheries programs have been growing in popularity in coastal areas across the U.S. since the first one got underway in New England in 2007. New Jersey launched its first community supported fisheries program in 2012 when the New Jersey Sea Grant Consortium Extension Program and Rutgers Cooperative Extension of Ocean County teamed up with Sea Salt CSA, a community supported agriculture program that connects local farmers to consumers. The project was part of a trial led by Gef Flimlin, marine extension agent of Ocean County, and Caroline McLaughlin, now former coastal communities agent for New Jersey Sea Grant. They served as liaisons between Sea Salt CSA's owner Jennifer LaMonaca and the local seafood sources, which included six New Jersey seafood businesses: Viking Village in Barnegat Light; Lund's Fisheries Inc. in Cape May; Nautical Nuggets Clam Farms in Oceanville; Maxwells' Shellfish in Port Republic; Point Lobster Co. in Point Pleasant; and LaMonica Fine Foods in Millville. This community supported fisheries program offered residents the option to purchase a seafood share from Sea Salt CSA for the season—from June through October—and featured local finfish and shellfish, helping to support the livelihoods of small-scale, local fishermen. This year's seafood selections included Mullica River oysters, farmed oysters, farmed clams, swordfish, calamari, scallops, lobster, and canned clam sauce. Similar to vegetable shares in CSA programs, the make-up of seafood shares, which were only available to current Sea Salt CSA customers in this pilot project, were ultimately determined by the availability of the catch.

Scallops were part of the weekly catch available to participants of the first community supported fisheries program in New Jersey in 2012.

Delaware Bay oyster harvested from Cape Shore facility owned and operated by Betsy Haskin, daughter of renowned Rutgers NJAES oyster researcher Harold Haskin, for whom the Haskin Shellfish Research Laboratory was named.



Decoding the Oyster for Aquaculture Development

Molluscs are an important group of marine invertebrates that play important roles in the coastal ecosystem. Oysters thrive in highly dynamic and challenging intertidal zones and estuaries. A team of international scientists, led in part by Professor Ximing Guo of the Haskin Shellfish Research Laboratory, completed the sequencing of the Pacific oyster genome, the first time that the genome of an oyster has been completely decoded. Their work, published in the journal *Nature* in October and widely reported globally, represents a major breakthrough in marine genomics that will likely have a great impact on biological, environmental, and fishery research. Oysters and other molluscs are important fishery and aquaculture species. Oysters, in particular, are one of the most widespread aquaculture

species in the U.S. and worldwide. In New Jersey and much of the mid-Atlantic region, native eastern oysters have been devastated by diseases. Rutgers NJAES has been selectively breeding oysters for disease resistance since the early 1960s and its oyster strains have shown strong resistance to one disease, but not to other new diseases. The Pacific oyster is a close sister species of the native eastern oyster and its genome provides a valuable catalog and map of genes that affect oyster biology. Using the Pacific oyster genome as a reference, Guo and colleagues plan to decode the genome of the native eastern oyster to identify the genes responsible for disease resistance. This will advance the field of genetics and Rutgers' selective breeding of farmed oysters and other molluscs.





Left: L-R: Professor Beverly Tepper guides Lumeng Jin, graduate student in food science, in a fragrance test. **Right:** Professor James Simon.

Food, Nutrition, and Health

Exploring the Connection of Flavors, Fragrances, and Perception

How do we perceive flavors and aromas? What components of foods, fragrances, and aromas contribute to perception? These are some of the questions that are being approached by an interactive group of Rutgers scientists who are examining the roles of flavors, fragrances and perceptions. Led by Beverly Tepper, professor of food science, and James Simon, professor of plant biology and pathology, an interactive team of scientists from across the university are tackling these questions from the most basic scientific levels with the goal of developing more appealing foods, including breeding plants that are enhanced in desirable flavors and aromas. Since many flavors and aromas are also biologically active, they may play an important role in human health by fighting microbes, reducing inflammatory responses, and lowering the risk of cancer. Understanding these biological activities of flavors and fragrances could lead to a new generation of health-promoting

food and consumer products. From exotic spices to common foods, the search for the chemical and genetic triggers in aromas and flavors that impact our food preferences, choices, and eating habits would have a significant impact on our diets. Rutgers researchers are dissecting the individual components within aromas to better understand the specific chemicals that trigger and contribute to specific perceptions. How flavors and aromas contribute to and trigger emotions and memory is another major component of the initiative being done in collaboration with Jeannette Haviland-Jones, professor of psychology at Rutgers. In addition, the research team is engaging with food and fragrance companies to help understand sensory characteristics, how they impact individual differences in perception, and how this can be translated into product development.

njaes.rutgers.edu/health

Did you know?

If the current trend continues, NJ would rank 1st nationally in obesity-related healthcare costs by 2030.

Promoting Digestive Health

The Center for Gastrointestinal Physiology is the newest research center to be launched within the New Jersey Institute for Food, Nutrition, and Health (IFNH). The new center operates under the leadership of Michael Rogers, a new faculty member in Rutgers' top-ranked Department of Food Science. The center is home to an international research collaboration with the TNO (Nederlandse Organisatie voor Toegepast Natuurwetenschappelijk Onderzoek, i.e. the Netherlands Organization for Applied Scientific Research). The IFNH-TNO strategic alliance is a "collaboration of excellence" that impacts the scientific community at the interface of food, nutrition, and technology. The mission of the center is to improve human health through fundamental research and functional food development. One of the special assets of the new center is the "TIM-1 System," an *in vitro* model of the stomach and small intestine that allows experiments to be done that could never be performed in animals or humans. Notably, the system can be adapted to model the digestive tract of infants and children, a study population that is not normally open to researchers. It is also noteworthy that the center houses the only TIM-1 System in an academic institution in the U.S. Already the TIM-1 System has become the special focus of student researchers like Adrienne Speranza, a George H. Cook Honors Scholar, and visiting scientists such as Amanda Wright from the University of Guelph in Ontario, Canada. The Center for Gastrointestinal Physiology is just one way that the IFNH is making New Jersey the "Healthy State" and a model for the nation.



Bradley I. Hillman
Director of Cooperative Research

Supported by strong relationships with federal, state, and local partners, NJAES has a proud history of leading and delivering the highest quality of innovative and targeted research. Faculty members in all 12 departments on campus and at outlying research and extension centers throughout the state address questions of importance to New Jersey residents.



Top: L-R: Student Adrienne Speranza, a food science and nutrition major, and Professor Michael Rogers with the TIM-1 system. **Bottom:** Anita Brinker, manager at IFNH, works with the mass spectrometer that provides analytical support to the TIM-1 System.



Food, Nutrition, and Health

Family and Community Wellness

To promote better health and wellbeing, Rutgers Cooperative Extension Family and Community Health Sciences (FCHS) educators taught elementary school children in nine New Jersey schools how to grow vegetables and fruits through the Grow Healthy Team Nutrition educational program, funded from 2010–12 by the New Jersey Department of Agriculture and USDA. Scores of “Wellness Champions” were trained to assist the FCHS educators with instruction and vegetable tastings, as well as manage the school gardens. The schools created wellness councils to engage families in the exchange of messages related to wellness, to promote role modeling, and to foster volunteerism. Taste tests introduced students to new foods and highlighted Farm to School initiatives such as school gardens and purchasing locally-grown produce. A key component of the Grow Healthy Team Nutrition program encouraged walking, incorporating the use of pedometers to record steps and short bursts of physical activity throughout the day. A 2010 survey by FCHS measured school foodservice readiness for implementing Farm to School activities, providing vital information regarding gaps in training for foodservice personnel. As a result, over the past two years, FCHS educators trained foodservice personnel how to integrate Farm to School initiatives and new school meal guidelines from the 2010 Dietary Guidelines and the USDA Hunger-Free Kids Act. With renewed Team Nutrition funding from 2012–14, FCHS will offer Grow Healthy, garden-enhanced education programs in 12–16 more schools in addition to an early childhood component. FCHS was also awarded a grant from the New Jersey Department of Health for the New Jersey Heart Disease and Stroke Prevention Program to implement a comprehensive worksite wellness program incorporating policy and environmental interventions that will reduce risks for heart disease, stroke, and obesity. The project, which targets small employers where the needs have been determined to be greatest, involves a partnership with the Employers Association of New Jersey and other New Jersey stakeholders.

School gardens provide children first-hand experience on how fruits and vegetables are grown.

Powdered tea and freshly whisked powdered green tea.



Using Nanotechnology to Improve the Delivery of Natural Compounds

Nutraceuticals—a combination of the words *nutrition* and *pharmaceutical*—represent the dietary compounds that provide both nutritional as well as health benefits, including the potential to prevent and treat diseases like cancer. One promising approach for managing cancer is nanochemoprevention, which involves the use of tiny nanoparticles to encapsulate dietary phytochemicals—the chemical compounds that occur naturally in plants—that have been shown to interfere with the development of cancer. Phytochemicals like curcumin found in turmeric and (-)-epigallocatechin-3-gallate (EGCG) found in green tea are well-known chemical agents that have shown remarkable potential in a wide range of cancer cell cultures and pre-clinical studies. Oral ingestion is considered the best method of administering these chemopreventive agents but the efficient absorption of many dietary types of phytochemicals, known as polyphenols, still require

more study. Rutgers food science professor Qingrong Huang is using his expertise in food nanotechnology and biopolymers to investigate various delivery systems to help increase the rate at which ingested dietary polyphenols are absorbed. Huang's lab recently developed a novel nanoemulsion system to improve the water solubility of curcumin and its rate of absorption when administered orally. Huang and colleagues produced nanoparticles composed of a combination of small peptides that have the ability to make minerals more soluble, including chitosan, a natural polysaccharide with commercial and possible biomedical uses. The nanoparticles were able to encapsulate EGCG and make it more easily absorbed in the body. This type of research demonstrates the potential of nanotechnology to study how natural compounds are absorbed and, based on this knowledge, to develop products to improve human health.



Left: Participants in “Hazard Tree Identification” class learn how a resistograph is used to check for decay. **Right:** Monica McLaughlin, horticulturalist at the Rutgers Gardens, teaches about cacti and succulents at Home Gardeners School.

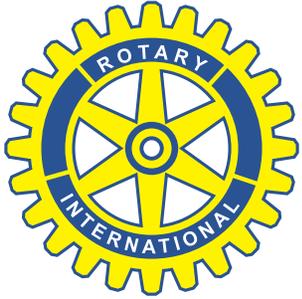
Home, Lawn, and Garden

The Office of Continuing Professional Education Provides Green Training

The Office of Continuing Professional Education (OCPE) continued its mission to serve New Jersey residents through professional development and personal enrichment training opportunities in a variety of “green” fields in 2012. The Home Gardeners School, one of its most popular programs, offered 35 workshops on topics ranging from creating curb appeal, to backyard chicken care, to eco-friendly native plants. More than 700 plant enthusiasts participated in this Saturday program and received gardening advice from top Rutgers NJAES experts. OCPE’s arboriculture classes, part of its professional landscape program, saw increased demand in the wake of Superstorm Sandy. With thousands of trees damaged during the storm, courses like “Hazard Tree Identification” and “Large Tree Climbing and Rigging” became critical resources for tree care professionals. Both the two-year program and the three-week preparatory course in OCPE’s Professional Golf Turf Management

School had banner years. The programs, which prepare turfgrass leaders to manage golf courses, sports fields, parks, and public grounds, had their highest enrollments in 15 years with students coming from as near as Hillsborough, NJ, and as far as Russia. OCPE’s youth development division, TEEM Gateway, partnered again with the Ocean County Private Industry Council to hold a summer experiential opportunity for county youth, exposing them to environmental careers through hands-on learning and vocational opportunities. From trail maintenance to recycling to habitat preservation, students have learned about plants, wildlife, watershed ecology, and New Jersey’s environmental challenges in this unique program since 2000. They also learned and practiced interviewing skills and received resume writing help to get them one step closer to a “green” career.

njaes.rutgers.edu/garden



Did you know?

Rutgers Gardens boasts one of the largest collections of American Hollies in the United States.

Rotary and Rutgers Partnership Yields Enabling Gardens

A partnership between Rotary International District 7510 and Rutgers has led to the launch this year of "Growing Lives One Seed at a Time," a unique, hands-on gardening initiative that promotes the creation of barrier-free, accessible garden spaces. The gardens can be any size, from single potted plants to customized raised planters to larger indoor or outdoor spaces where those with physical or other limitations can take advantage of the full benefits gardening has to offer. This pilot Rotary and Rutgers Enabling Garden Initiative for Central New Jersey is coordinated by Nick Polanin, agricultural and resource management agent in Somerset County and statewide coordinator of the Rutgers Master Gardener Program, and Laura DePrado, Rotary International member and chair of the joint Rotary-Rutgers project. DePrado created this initiative, targeted to residents in Hunterdon, Mercer, Middlesex, Somerset, and Union counties that make up Rotary International District 7510, while she was a student in the Horticultural Therapy Certificate Program at Rutgers. Since its launch at the Rutgers Floriculture Greenhouses on March 23, locations in all five counties are working towards adopting this enabling garden initiative, including its most recent partner, AristaCare at Cedar Oaks, a long-term care facility in South Plainfield. Rutgers provides consumer horticulture, agriculture and plant science, soil sciences, and landscape design expertise to this pilot project, which has gained the attention of the American Horticultural Therapy Association, a nonprofit organization that advances the practice of horticultural therapy to improve human well-being.



Larry S. Katz
Director of Cooperative Extension

From the first Cooperative Extension office established in 1912 in Sussex County, the unbroken commitment to outreach continues under the Rutgers Cooperative Extension model, serving residents through well-established programs in all 21 counties in New Jersey and initiating programs to respond to emerging needs in traditional and previously underserved communities.

Top: Rutgers horticultural therapy expert Joel Flagler demonstrates adaptive planting tools to Ed Rosenhaft, a recovering stroke victim and Union County Rotary Club member. **Bottom:** Rutgers Research Farm Supervisor Nikki Graf leads the Floriculture Greenhouse tour for Central Jersey District 7510 Rotary members. 18



njaes.rutgers.edu/garden

Home, Lawn, and Garden

Growing Healthy Trees in the Urban Setting

As urban populations expand, there is an increasing need to address quality of life issues within the urban infrastructure. Trees are essential components of cityscapes, adding beauty, improving air quality, and reducing urban heat island effects. The health of urban trees is often determined by access to viable soils since shared soil spaces often must serve both engineering needs (for safe and reliable infrastructure) and biological needs (for plant growth). Therefore, designing a soil system within the framework of a sound pavement plan that serves both engineering and plant needs must consider the visual, social, and environmental benefits provided by healthy large trees as well as the structural needs of the overall urban design. Through its Urban Forestry Program, NJAES contributes important research that focuses on defining tree growth response in experimental and working installations, water availability, and drainage. In collaboration with the Rutgers Center for Advanced Infrastructure and Transportation, the program has been at the forefront in defining how root growth below pavement can be accommodated within a layered pavement system design. For his role in developing and leading ongoing research in designed tree-pavement soils over the past 20 years, Professor Jason Grabosky won the 2012 L.C. Chadwick award for Arboricultural Research from the International Society of Arboriculture. Named for noted horticulture researcher and professor Lewis Charles Chadwick, this award recognizes individuals for their valuable contributions to the field of arboriculture. Research on wind interception of trees, tree pruning to address emerging issues in the wake of recent storms throughout the Northeast, and forest resilience to climate change are among the important collaborations of the Rutgers Urban Forestry Program with partners at the University of Florida and the Hurricane Research Institute at the Florida International University.

While trees provide many benefits to urban landscapes, their health is dependent on a sound soil system.



Soil sampling for bulk density to evaluate compaction.

Land and Soil Management

How soil is managed impacts the condition of our waterways, plants, and human health. Years of use and abuse have resulted in eroding and contaminated soils, low in actual fertility and organic matter. Proper land care management is vital to reversing this decline, and Rutgers Cooperative Extension (RCE) has been an important partner in this process. RCE of Essex and Middlesex counties collaborated with the Northeast Organic Farming Association of New Jersey to implement an Organic Land Care Certification Program for professional landscapers that focused on a number of topics, including organic management and improvement of soil. This program can potentially impact close to 1,300 acres of golf courses, athletic fields, parks, and residential lawns across New Jersey. Also, a statewide conference, "S.O.S. – Sustainable Opportunities through Soil," informed a

wide range of land care professionals on the necessity of healthy soils for sustainable ecosystems and benefits of moving from impermeable infrastructure to permeable landscapes. Sponsored by Rutgers NJAES and the New Jersey Association of Professional Soil Scientists, lead organizers of the event included the New Jersey Association of Conservation Districts, the Ocean County Soil Conservation District, and the Barnegat Bay Partnership. Research conducted by Rutgers soil fertility specialist Joseph Heckman played a key role in changing national soil nutrition standards. Heckman's field trials using soluble silicon applied to crops like cucumber and pumpkin showed natural resistance to powdery mildew disease and other benefits. As a result, the Association of American Plant Food Control Officials has now designated silicon as a "plant beneficial substance."



Left: Damage by Superstorm Sandy in Ortley Beach, NJ.
Right: Rutgers professor and New Jersey State Climatologist David Robinson.

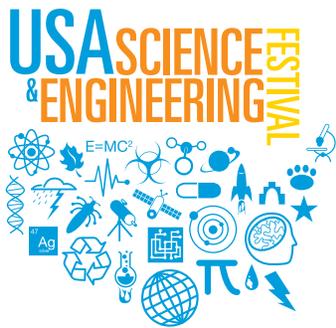
Youth and Community Development

Responding to Superstorm Sandy

NJAES faculty and staff responded to the significant challenges that Superstorm Sandy presented in our local communities. David Robinson, the New Jersey State Climatologist—a position supported in part by NJAES—provided up-to-date weather summaries and was among several Rutgers faculty to offer timely interpretations of how weather patterns may be amplified by global warming, potentially resulting in storms of increased severity. Right after the storm, Rutgers Cooperative Extension (RCE) agricultural and resource management agents worked with farmers and the New Jersey office of the USDA Farm Services Agency to assess damage to crops, facilitating a unified, multi-county disaster declaration. In addition, extension faculty helped identify those farmers with critical generator needs, assisting in getting generators where needed. RCE also participated in a statewide program to

rescue and care for pets and livestock that were marooned or otherwise threatened due to evacuation or storm damage to barns, stables, and homes. When ResponseForce1, the organization commissioned to build and operate two large base camps and a mass care shelter in New Jersey, found itself stranded without a propane contractor to provide fuel for its operations, Bill Sciarappa, agricultural and resource management agent in Monmouth County, stepped in. He secured a local propane distributor to supply fuel to power the base camps for the masses of emergency responders who poured into New Jersey as well as the Monmouth Park shelter for displaced residents. Sciarappa, like all RCE agents and specialists strategically placed across New Jersey, is an important local resource, providing “boots-on-the-ground,” demonstrating the incalculable impact of RCE outreach activities statewide.

njaes.rutgers.edu/youth



Fostering Youth Development through 4-H

Whether on the county, state, or national level, 4-H provides many opportunities for youth to learn and develop valuable skills. The New Jersey 4-H Horse Project is one of the largest 4-H projects with over 1,600 club members. In addition to county 4-H horse shows, youth enjoy several opportunities on the state level, including Model Horses; Equine Art; Horse Quiz Bowl; Horse Judging; Hippology; and Equine Presentations. More than 150 youth participate each year in these activities and close to 300 are involved in the State 4-H Horse Show. New Jersey sends 16 youth every year to the Eastern National 4-H Roundup competition, and in 2012, three of the four New Jersey teams placed in the top 10. Each year, 50 teenagers are selected from urban communities across the state to participate in the Rutgers 4-H Summer Science Program. Following a week of campus research enrichment, the teen participants return home to serve as 4-H Science Ambassadors in their local 4-H program, delivering youth science programs in afterschool and summer settings. The North Jersey and South Jersey 4-H Teen Conferences (NJTC and SJTC) are three-day educational programs for 4-H members. The conferences focus on leadership development, team building, service learning, and building youth-adult partnerships. Both conferences have been recognized with Excellence in 4-H Programming Awards from the New Jersey Association of 4-H Agents as well as national Excellence in Teen Programming awards from the National Association of 4-H Agents. National youth development opportunities are also available to New Jersey youth and this year, six 4-H Science Ambassadors from Passaic and Mercer counties were selected to represent National 4-H at the USA Science and Engineering Festival, considered the largest celebration of science and engineering in the U.S. and hosted by Lockheed Martin in Washington, DC.



Did you know?

On average, 4-H members contribute more service hours to their communities than any other group of youth.



Top: Youth participate in USA Science and Engineering Festival. **Bottom:** Enjoying the day at Lindley G. Cook 4-H Camp.



Youth and Community Development

Ensuring Access to Healthy Food

The New Brunswick Community Farmers Market, a joint venture among Rutgers, Johnson & Johnson, and the City of New Brunswick, has partnered with Rutgers Cooperative Extension of Middlesex County, Catholic Charities (Unity Square Partnership), and Elijah's Promise to form the New Brunswick Community Gardeners Coalition, whose overall goal is to encourage residents to grow their own food and improve their understanding of urban gardening. This coalition has joined a consortium of faith-based community groups and businesses named the New Brunswick Community Food Alliance, which seeks to improve the availability and accessibility of healthy food in New Brunswick. This coalition hosted its first winter "Seed and Story Swap" for novice gardeners, a citywide event that encouraged residents to exchange seeds, find new ones to grow during the season, and share food and agricultural stories. The event featured workshops for adults on winter seed sowing and soil testing, and included a session for youth on vermicomposting (composting with worms). Michele Bakacs, environmental and resource management agent for Middlesex and Union counties, discussed the dangers of lead contamination in urban soils and shared best practices for protecting the novice gardeners and their families. Bakacs taught participants how to take a soil sample at home and she performed free lead analyses, made possible by a grant from the U.S. Environmental Protection Agency. Successfully making the case for strong student demand for fresh produce at a convenient campus location, the student governing council on the George H. Cook Campus and Slow Food Rutgers teamed up to bring a vendor from the New Brunswick Community Farmers Market for the first time to their "doorstep" during the fall. Pop's Farm Market set up an on-campus stand so that Rutgers students and local residents could conveniently shop for *Jersey Fresh* produce.

Dylan Lopez visits the New Brunswick Community Farmers Market.

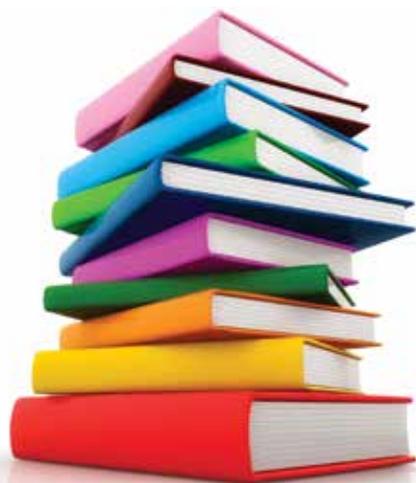
Professor Barbara O'Neill conducts financial literacy training for librarians.



Financial Literacy Training for Librarians

Local libraries have long been a useful resource for residents seeking straightforward, unbiased information about personal finances. However, research has found that few public librarians receive training in financial literacy and, like much of the general public, lack adequate education in finances. Funding provided by the Financial Industry Regulatory Authority, Inc. (FINRA) Investor Education Foundation and the Institute of Museum and Library Studies (IMLS) is building capacity among librarians to respond to patrons' financial questions and educate the general public about investing and other personal finance topics. To promote financial literacy, Rutgers Cooperative Extension (RCE) was contracted to work with two library systems to train its librarians. Barbara O'Neill, extension specialist in financial resource management, along with Carole Glade, a financial educator, developed and conducted training programs

for the Burlington County Library System (BCLS) in New Jersey and the New York Public Library (NYPL). With both the BCLS and NYPL contracts, class topics were chosen by the libraries in consultation with RCE personnel. BCLS received a Smart Investing@your library® investor education grant from the FINRA Investor Education Foundation and the American Library Association. The BCLS training introduced library staff to basic financial and investment concepts and online investor education resources and provided 30 classes and webinars for consumers. NYPL received an IMLS grant to create a corps of frontline staff equipped with the skills and confidence to meet patrons' demands for access to timely, accurate, and unbiased information. Among the significant goals of this financial literacy project is to create training materials that other public libraries across the U.S. can adopt.





Left: Preparation of *Jersey Fresh* vegetables for production of Very Veggie Pasta Sauce at the Rutgers Food Innovation Center.

Right: A new student-approved menu item developed by the Rutgers Food Innovation Center for New Jersey school lunch menus—Eggplant Rollatini with Chunky Primavera Sauce, made with a harvest of *Jersey Fresh* vegetables and herbs.

Economic Development

Food Industry Gateway

The resources of the Rutgers Food Innovation Center (FIC), in Bridgeton, NJ, and the Rutgers' Center for Advanced Food Technology on the New Brunswick campus have been combined into the new Rutgers Food Industry Gateway, a business incubation and economic development accelerator for the food and agricultural sectors. Operating under the umbrella of the Gateway, the centers will now be known as the Food Innovation Center–North, located in Piscataway, NJ, and the Food Innovation Center–South, located in Bridgeton, NJ. The Gateway provides business and technical expertise to emerging and established food companies in the mid-Atlantic region and utilizes its outreach capacity to serve food and agribusinesses globally. The Gateway is also a guide to the wide range of expertise within the university's departments and institutes, including the New Jersey Institute of Food, Nutrition,

and Health; the Department of Food Science; the Department of Nutritional Sciences; and the Department of Human Ecology. The enhanced capacity of the Gateway is now paired with the vast resources within Rutgers, as well as strategic national and international partners. Clients have access to business development; market research; product and process development; extensive training programs; advanced analytical services; food and beverage packaging; regulations and compliance support; and quality assurance and food safety systems. Both FIC–North and FIC–South are USDA-inspected facilities; FIC–North is also a canning operation licensed by the Food and Drug Administration. As production incubators, they manufacture products in final, saleable form as well as offer short courses and workshops targeted to food science and culinary professionals.

njaes.rutgers.edu/economic-development



New Jersey Clean Energy Resource Network

The Rutgers EcoComplex in Bordentown, NJ, leads a new initiative called the New Jersey Clean Energy Resource Network (NJCERN), a comprehensive business development strategy for clean energy and energy efficiency companies in the state and those considering relocation to New Jersey. This collaborative initiative among Rutgers NJAES, the New Jersey Board of Public Utilities, and the New Jersey Economic Development Authority will provide critical support for startup and existing clean energy companies. In addition, it supports the New Jersey Partnership for Action and the objectives of the New Jersey Master Energy Plan. There are three elements to NJCERN. First, there is the NJCERN Database, a web-based, centralized guide to the advantages of doing business in New Jersey, with over 300 links to state, federal and private resources. This is the most extensive database for energy resources in the U.S. A second element is The Clean Energy Business Cluster Strategic Plan, a strategy for leveraging existing public and private resources that offers a roadmap for developing previously unavailable resources vital to clean energy business development. This plan will be implemented by the EcoComplex in collaboration with relevant public and private partners, with the goal of making NJ the hub for the clean energy sector. The third element is the New Jersey Clean Energy Innovation Council, which comprises experts from academia and government who evaluate the paths, technologies, and businesses to sustain a clean energy future for New Jersey. The council evaluates new business concepts for project developers, entrepreneurs, and investors in order to accelerate the development of a vibrant clean energy industry in the state.



Margaret Brennan-Tonetta
Director for Economic Development

NJAES is an economic engine for New Jersey and is proud of its strong collaborations with government, community, and industry partners. From food to bioenergy to aquaculture, these partnerships serve to catalyze and support NJAES' first-class research and outreach programs. Impacts include more viable businesses, stronger industry sectors, and vibrant communities in NJ.

Did you know?

NJ food firms and agribusinesses create about \$100 billion in sales, 9% of private sector gross product, and 17% of jobs.



Top: Rutgers EcoComplex. **Bottom:** Panels at the Rutgers Solar Array Farm on the Livingston Campus, Piscataway, NJ.



Left: Large lawn, low maintenance stand of fine fescue at Rutgers' Snyder Farm. **Right:** Mowing demonstration on plot of tall fescue at the Rutgers' Snyder Farm.

Supporting NJAES

Gift Supports Turfgrass Science

Much like Clifford and Melda Snyder, New Jersey farmer Sam Leon believed in education, hard work, honest dealings and civic service. This was evident in his service on the Kingwood Township Committee, its planning board, and several years as mayor. A hard worker, Sam led by example, expecting his family to invest carefully and wisely in their sod business. Sam's work ethic and beliefs are alive and well at Rutgers' Snyder Farm, which provides training in lawn and garden care, natural grass sports fields, youth development, and water quality. The Snyder Farm aims to keep New Jersey farmers profitable while at the same time striving for environmental and community responsibility. Sam Leon kept a lifeline to Rutgers, both to improve his knowledge and his business. His granddaughter, Jamie, and her husband, Rudy,

learned alongside Sam, completing summer internships at Snyder Farm during their youth. Early in 2012, Rudy and Jamie made a gift to remember their beloved Sam Leon that will allow Rutgers to teach turfgrass management in a new way. Most Hunterdon County home lawns are substantially larger than typical New Jersey lawns due to zoning ordinances for environmental preservation. Addressing turfgrass management for large lawns is a unique need that's met by Snyder Farm since information for homeowners generally does not address lawn size. The gift, in memory of Sam Leon, will support low maintenance turfgrass sites used for hands-on training at the Snyder Farm for both homeowners and Rutgers Master Gardener volunteers, who answer helpline questions from homeowners regarding lawn care.

njaes.rutgers.edu/development



Honoring Youth Development

In the 1940s, Willard F. Bitzer worked for Rutgers New Jersey 4-H in both Atlantic and Sussex counties. At Rutgers, Bitzer inspired youth to become leaders and encouraged them through the “learn-by-doing” approach of 4-H. After his passing in 1996, his family, understanding how much youth and 4-H meant to him, created the Willard F. Bitzer Travel Award in his memory. At the request of his widow Evelyn and grandson Michael, this endowment provides assistance for New Jersey 4-H youth to attend the National 4-H Conference. This conference, hosted by the USDA, at the invitation of the Secretary of Agriculture, brings youth and adults together to develop recommendations that help guide 4-H Youth Development Programs nationally and in their communities. This annual event is attended by approximately 350 young people from all 50 states, plus Puerto Rico and Canada. Participants at the 4-H conference work in committees, discussing ideas and issues that form a strategic plan, which the delegates are expected to implement in their state during the upcoming 4-H year. Participants also have an opportunity to visit congressional representatives. Recently, Evelyn Bitzer herself passed away and, in her memory, the family chose to double the existing endowment from her estate. The Bitzer family has long recognized the value of 4-H and what their contributions have meant to the scores of young people who have gained valuable life skills through participation in the National 4-H Conference. To learn more about gifts, including planned gifts, please contact our development office to discuss our many funding opportunities and giving levels. Please call 848-932-3593 or email karl@aesop.rutgers.edu.



Kelly L. Watts
Director of Development

Private support for NJAES from alumni, friends, and industry partners allow us to address real-world problems here in the Garden State and across the U.S. Your giving provides countless opportunities for our faculty, agents, specialists, and students to develop practical solutions, like developing alternative energy sources, preserving environmental quality, and promoting better nutrition.

Did you know?

Donors have provided critical funds for NJAES to partner with local farmers and agencies to fight hunger in NJ.



A 4-H student at the Rutgers Summer Science Program participates in the Wildlife Biology Class.

Serving New Jersey and Beyond

Board of Managers

The New Jersey Agricultural Experiment Station Board of Managers, appointed by the Rutgers Board of Governors, is an advisory group to the executive dean of agriculture and natural resources and executive director of NJAES. The board consists of a representative from each county nominated by the County Board of Agriculture or Board of Chosen Freeholders, and a six-member statewide advisory committee. The president of Rutgers, the executive director of NJAES, and the state secretary of agriculture serve as *ex officio* members.

Atlantic County	August Wuillermin
Bergen County	Guy Nicolosi
Burlington County	Raymond Hlubik
Camden County	Vacant
Cape May County	Warren Stiles
Cumberland County	Maurice Sheets
Essex County	Frank Yesalavich
Gloucester County	Amy Link
Hudson County	Vacant
Hunterdon County	Meredith Compton, Vice President
Mercer County	Louis Makrancy, President
Middlesex County	Robert VonThun
Monmouth County	Pat Butch
Morris County	Carol Davis, Corresponding Secretary
Ocean County	Ron Vreeland
Passaic County	Rocky Hazelman
Salem County	David Dolbow
Somerset County	Kenneth Osterman
Sussex County	Carladean Kostelnik
Union County	Richard Montag
Warren County	Tracy Smith

Statewide Advisory Committee

Biotechnology	Linda Rhodes
Community Resources	Lisanne Finston
Environment	Gene Huntington
Food Science	Pearl Giordano
Marine Science	Stephen Carnahan
Public Policy	Vacant

County Extension Offices

Atlantic County	609-625-0056
Bergen County	201-336-6781
Burlington County	609-265-5050
Camden County	856-216-7130
Cape May County	609-465-5115
Cumberland County	856-451-2800
Essex County	973-353-1338
Gloucester County	856-307-6450
Hudson County	201-369-3432
Hunterdon County	908-788-1339
Mercer County	609-989-6833
Middlesex County	732-398-5262
Monmouth County	732-431-7260
Morris County	973-285-8300
Ocean County	732-349-1152
Passaic County	973-305-5742
Salem County	856-769-0090
Somerset County	908-526-6295
Sussex County	973-948-3040
Union County	908-654-9854
Warren County	908-475-6505



2012 Annual Report Environmental Savings

Off-Campus Stations

Clifford E. and Melda C. Snyder Research and Extension Farm
Rutgers Center for Sustainable Agriculture, Pittstown
snyderfarm.rutgers.edu

Haskin Shellfish Research Laboratory, Bivalve
hsrl.rutgers.edu

Lindley G. Cook 4-H Youth Center for
Outdoor Education, Branchville
nj4hcamp.rutgers.edu

Philip E. Marucci Center for Blueberry and
Cranberry Research and Extension, Chatsworth
pemaruccicenter.rutgers.edu

Rutgers Agricultural Research and Extension
Center, Upper Deerfield
njaes.rutgers.edu/rarec

Rutgers EcoComplex - Rutgers Environmental Research
and Extension Center, Bordentown
ecocomplex.rutgers.edu

Rutgers Food Innovation Center–South, Bridgeton
foodinnovation.rutgers.edu

Rutgers Food Innovation Center–North, Piscataway
foodinnovation.rutgers.edu

Rutgers Fruit and Ornamental Research Extension Center,
Cream Ridge
creamridge.rutgers.edu

Rutgers Plant Science Research and Extension Farm, Adelphia
njaes.rutgers.edu/plantscience

Rutgers University Marine Field Station, Tuckerton
marine.rutgers.edu/rumfs

Centers and Institutes

Aquaculture Innovation Center
marine.rutgers.edu/main/New-Jersey-Multispecies-
Aquaculture-Demonstration-Facility

Center for Deep-Sea Ecology and
Biotechnology
deepseacenter.rutgers.edu

Center for Endocrine Studies
endocrine.rutgers.edu

Center for Remote Sensing and Spatial Analysis
crssa.rutgers.edu

Center for Turfgrass Science
turf.rutgers.edu

Center for Vector Biology
vectorbio.rutgers.edu

Equine Science Center
esc.rutgers.edu

IR-4 Project: Center for Minor Crop Pest Management
ir4.rutgers.edu

Water Resources Research Institute
njwri.rutgers.edu

Wildlife Damage Control Center
njaes.rutgers.edu/wdcc

Related Links:

Rutgers, The State University of New Jersey
rutgers.edu

School of Environmental and Biological Sciences
sebs.rutgers.edu

SEBS and NJAES Newsroom
sebsnjaesnews.rutgers.edu

3

TREES PRESERVED FOR
THE FUTURE



127 lbs

OF SOLID WASTE **NOT**
GENERATED



8 lbs

WATERBORNE WASTE
NOT CREATED



1,149 gal.

WASTEWATER FLOW SAVED



250 lbs

NET GREENHOUSE
GASES PREVENTED



1,915,900 BTUs

ENERGY **NOT** CONSUMED

The savings above are achieved when post-consumer recycled fiber is used in place of virgin fiber. This project, based on a production run of 5,000 pieces, used 3,220 lbs of paper, which has a post-consumer recycled percentage of 10%.

Acknowledgments:

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