

2015 • Agency 229 • Annual Report

Partners *for* Progress



**Virginia
Cooperative
Extension**

Virginia Tech • Virginia State University



VirginiaTech®

Virginia Agricultural
Experiment Station

Contents

A message from Provost Rikakis.....	1
Agritourism study finds on-farm activities are good business for farmers	2
Aquaculture's tide is rising in the commonwealth.....	3
Helping communities become more sustainable and economically secure.....	4
Virginia Tech goes full steam ahead with hops research.....	5
Improving milk quality proves profitable for Virginia farmers	5
Living the Legacy – 4-H Forever.....	6
Digital media program empowers youth to express themselves.....	7
Adding value pays off for Virginia cattle producers	8
Agency 229 is.....	10
New dairy complex boosts industry	11
Celebrating a decade of Virginia Master Naturalists.....	12
Virginia forest assessment provides good news with a cautionary note	13
New building cooks up industry engagement	14
Virginia Tech leads the way in ag biotechnology initiative	15
Less weeding, more feeding	15
Workshops teach families the necessary skills to transition land.....	16
New Healthy Beverage Index may help consumers improve	17
cardiometabolic health.....	17
Virginia Tech contributes to record agricultural export number.....	17
Initiative gets SNAP consumers to farmers markets.....	18
New program helps community members access fresh produce.....	19
Extension agents reach out to unlicensed child care providers.....	19
History provides backdrop for pesticide training	20
By the numbers	21
College helps drone industry take off.....	22

Cover: The new Dairy Science Complex – Kentland Farm has state-of-the-art facilities where students, scientists, and Extension faculty can work together on basic and applied research to solve challenges facing the dairy industry.

Administrative Council for Extension and Experiment Station Research

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VT/1015/VCE-657

Partners *for* Progress

A message from Provost Rikakis

Virginia Tech is making an impact in the Commonwealth of Virginia and, indeed, around the world.

The stories in the following pages speak to the partnership and dedication of Virginia Cooperative Extension and the Virginia Agricultural Experiment Station — the two agencies that make up Agency 229 — and the real and meaningful impact they have on Virginians daily.

This impact is a result of working together to generate research-based knowledge that addresses critical societal needs and to share that knowledge through education, extension, and outreach efforts.

- We are helping dairy producers improve milk quality to keep Virginia's dairy industry profitable and competitive.
- We have reached more than 202,000 young people in 2014 with our 4-H youth programs that build life skills and develop future leaders.
- We are keeping Virginia's \$17 billion forest industry profitable through forest management research.
- And we are helping to make fruits and vegetables more accessible to the 3.1 million Virginia households that do not have a reliable source of affordable, nutritious food.

Without strong support from our local, state, and federal partners, this impact would not be possible. For every \$1 that the state invested in our programs in 2014, we generated an additional \$1.78 in external funding that helped us expand our programs and keep them relevant.

Our continued success is a direct result of your investment. We encourage you to read about how Agency 229 is making a positive difference in the homes, classrooms, farms, and communities across the state. Visit our websites — www.ext.vt.edu and www.vaes.vt.edu — to learn more about how we are extending knowledge and changing lives.

Working together, we can keep Virginia strong.

Sincerely,

Thanassis Rikakis

Executive Vice President and Provost

Chair, Administrative Council for Extension and Experiment Station Research



Agritourism study finds on-farm activities are good business for farmers

From pick-your-own strawberry operations and winery tasting rooms to pumpkin patch fields and cut-your-own Christmas tree farms, agritourism is growing in the commonwealth and across the country. A recent statewide study by Virginia Tech and Virginia Cooperative Extension found that visiting farms is not just a pleasant way for consumers to leisurely spend a Sunday — it's also a viable way for farmers to supplement their income.

The study defines agritourism as a value-added activity that generates additional net farm income and creates a loyal consumer base for branded farm products.

Agriculture is Virginia's No. 1 industry; it has consistently grown over the last two years, reaching a record \$3.35 billion in exports in 2014. Tourism is the second-highest revenue-generating industry in the commonwealth, contributing \$21.2 billion to the state's economy and making a marriage of the two industries a logical economic strategy for growing businesses.

Forty-two percent of operators who responded to the survey reported that agritourism contributed between 76 and 100 percent of their farm income. The study also found that in 2013 almost all of the operations surveyed claimed that the average agritourism visitor spent \$31 to \$40 on the property per visit.

Wineries accounted for 44 percent of the respondents. The growth of the wine industry in the commonwealth over the last 10 years was cited in the study as a positive example of the economic power of agritourism.

"The study dealt with a decline of the midsize farms in the commonwealth, so finding ways to help the entrepreneur who would be likely to start a farming operation of this size was important," said Gustavo Ferreira, assistant professor of agricultural and applied economics and Virginia Cooperative Extension economist.

Unlike Europe, where agritourism has been a common activity that engages tourists and encourages interaction with local farmers, agritourism is not thought of in the same way in the United States. This could be causing both the agriculture and tourism industries to lose revenue, not to mention the lost opportunity to strengthen relationships between farmers and consumers.

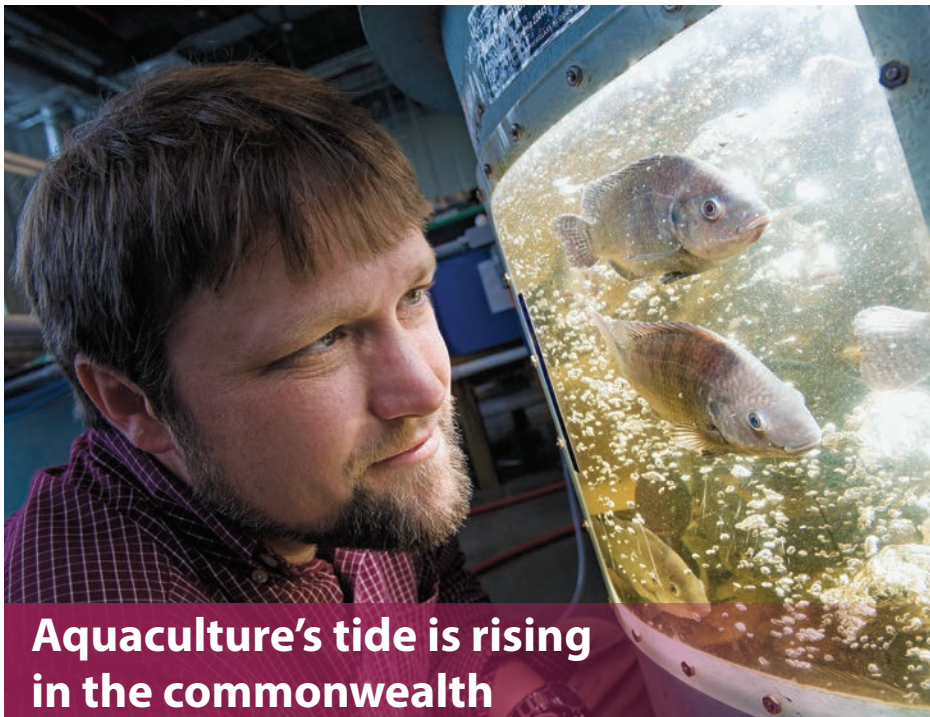
"Farming isn't just good business, it's good community building," said Martha Walker, an Extension community viability specialist and collaborator on the study. "Our survey found that overall the industry is viable and has the potential to add value and income to the state's No. 1 industry."



Tourism is the second-highest revenue-generating industry in the commonwealth, contributing

\$21.2 billion
to the state's economy.





Aquaculture's tide is rising in the commonwealth

Due to demand and population growth projections in the United States, the forecasted domestic seafood gap in 2025 is 2 million to 4 million tons, a national resource deficit second only to oil.

Assistant Professor of Food Science and Technology David Kuhn is working to capitalize on this demand to strengthen the aquaculture industry in the commonwealth, and his efforts will have far-reaching impacts beyond Virginia's borders.

"In terms of a global view, fish is a good way to get protein into people's diets," said Kuhn.

Unlike resource-intensive cattle, it only takes 1 to 2 pounds of feed to grow 1 pound of fish.

Finfish like tilapia are ideal for Kuhn's purposes because they prefer to be in dense conditions, school well, grow quickly, and are native to fresh water. Tilapia is a popular seafood item among consumers in the United States, and in 2014 Americans imported 1.4 billion pounds of the fish.

Kuhn's research focuses on improving the health of farmed tilapia by increasing disease resistance and improving nutrient utilization to make tilapia higher in omega 3, like more popular marine finfish such as salmon.

Because some aquaculture enthusiasts who would be interested in farming the fish have limited space for storing it, he also wants to research some ways to add value to the end product of the supply chain by not just selling whole fish, but also value-added filets.

Kuhn has been working with Blue Ridge Aquaculture, in Martinsville, Virginia, to increase its production of farmed tilapia. The company is the world's largest producer of tilapia using indoor recirculating aquaculture systems. Currently the company produces more than 4 million pounds of the fish per year.

"Virginia is poised to be an excellent player in the aquaculture industry with its superb access to markets in Washington, D.C., and New York and its attractive labor pool," Kuhn said. "Modern, integrated aquaculture facilities are a 24/7 operation and require a dependable and also highly skilled workforce to run them. We have both of those things in Southwest Virginia."

Tilapia are well-suited to Assistant Professor of Food Science and Technology David Kuhn's research because they school well, grow rapidly, and are native to fresh water.

In 2014 Americans imported

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“Virginia is poised to be an excellent player in the aquaculture industry with its superb access to markets in Washington, D.C., and New York and its attractive labor pool.”

— David Kuhn
Assistant Professor of Food Science
and Technology





Helping communities become more sustainable and economically secure

Ten years ago, an endowment was created to help communities across the commonwealth and beyond be more sustainable and resilient through partnerships with Virginia Cooperative Extension, Virginia Tech, and local community members.

Since its inception in 2004, the endowment, which has grown to more than \$2 million, has provided income to fund numerous projects that foster partnerships and spur creative research at the granular level. It has also provided seed money for an array of projects with wide-ranging impacts.

"A gift like this can get lots of different projects started," said Rick Rudd, head of the Department of Agricultural, Leadership, and Community Education and the Virginia Cooperative Extension Professor of Excellence in Community Viability, a position funded by the endowment. "We are helping people leverage resources."

The gift was given in honor of R. Michael Chandler, Donald P. Lacy, and J. Douglas McAlister in recognition of their service to Virginia Cooperative Extension.

One initiative that has its roots in the Community Viability Endowment is the Virginia Agricultural Leaders Obtaining Results program. Supported with seed

money from the endowment, the program trains professionals from industry, academia, research, and education to serve as leaders in the agricultural industry.

Another program currently being funded is the Appalachian Foodshed Project. Funds from the Community Viability Endowment have helped get crucial conversations started about strengthening food security networks throughout Appalachia.

"The project has brought more awareness about the challenges Appalachia faces when talking about community food security," said Susan Clark, associate professor of horticulture and director of the program. "By listening to what community stakeholders are telling us, everyone learns how to work together to meet the goal of regionally enhanced food security."

In the Shenandoah Valley, Harrisonburg EATS is also being funded by the Community Viability Endowment.

"We're hoping to engage the community but also to have those tangible impacts that come out of this process," said Beth Schermerhorn, education research support specialist at the Virginia Sustainable Agriculture Research and Education development program. "Part of our goal is

A \$2 million endowment

funds numerous projects that foster partnerships and spur creative research.

not only increasing food security through access, which seems to be what the broader discussion is about, but also providing meaningful employment that provides a salary and living wage through food systems."

Other projects funded this year include programs to expand science-based outreach and to use agricultural curriculum as a multidisciplinary teaching tool.

Beth Schermerhorn is conducting a survey to measure food access in Harrisonburg. Her project, Harrisonburg EATS, is funded through the Community Viability Endowment.



Virginia Tech goes full steam ahead with hops research



With more than 100 craft breweries, Virginia is quickly emerging as a significant player in the East Coast beer scene. Membership in the Old Dominion Hops Cooperative has grown from about 20 members to more than 80 over the past two years.

The burgeoning craft beer industry supports more than 8,000 jobs in the commonwealth and has a \$623 million economic impact on the state, according to the Virginia Craft Brewers Guild.

And Virginia Tech is helping the commonwealth dive into the suds business. The university is currently conducting two studies — one examines the fermentation of hops, and the other studies the crop itself.

Holly Scoggins, associate professor of horticulture, is leading the research on the crop. She will head up the experimental hops yard that will be planted this fall with \$8,900 in grant funding from the Virginia Agricultural Council. Scoggins is hoping to determine which hop varieties are best-suited to Virginia's shorter summer days and most resistant to Mid-Atlantic pests.

"I'm excited," said Scoggins. "There is a dearth of information out there, and we can be of service to our Extension agents who may get questions about hops production."

A popular variety she plans to experiment with is Cascades.

Scoggins is also collaborating with faculty members from the Department of Plant Pathology, Physiology, and Weed Science to study downy mildew resistance in hops.

While the craft brewing industry is growing, Virginia and the Mid-Atlantic lag far behind in hops production. One acre of hops plants in Oregon produces between 1,000 and 2,000 pounds of dried hops. Meanwhile, the same variety grown in North Carolina yields 160 to 320 pounds of dried hops, according to research done by North Carolina State University.

Improving milk quality proves profitable for Virginia farmers

Though the dairy industry in Virginia is small compared to other states, the commonwealth produces 207 million gallons of milk annually, worth about \$481 million according to the Virginia State Dairymen's Association.

However, hot, humid summers add challenges to milk production in the region. Reduced milk quality results in increased production costs for farmers while decreasing revenues and sustainability.

Christina Petersson-Wolfe, associate professor of dairy science and Extension specialist, wants to help improve the quality of the state's milk.

Petersson-Wolfe, working with the Southeast Quality Milk Initiative, is helping dairy producers in the commonwealth and the region compete more effectively by lowering bacterial counts in milk, thus commanding better prices in the marketplace. Virginia Tech has partnered with the University of Tennessee, University of Kentucky, University of Georgia, and University of Florida to implement the \$3 million multistate project funded by the U.S. Department of Agriculture.

Milk quality is commonly measured by the somatic cell count and standard plate — or bacteria — count. Most buyers in the region require the milk they purchase to have a

somatic cell count of fewer than 400,000 cells per milliliter, but farmers strive to attain a count closer to 200,000.

Since the inception of the program, the average somatic cell count in Virginia has dropped 5.8 percent. These numbers can add up when dairy farmers receive their milk premiums — cash above and beyond the standard rate of about \$17 per 100 pounds. Premiums can add up to thousands of dollars per month. One dairy farm that benefited from consultation with the milk initiative saw an increase of \$8,640 per month.

"Our overall goal is to enable dairy farmers to move toward production systems compatible with a sustainable industry," said Petersson-Wolfe.

Virginia generates

1.7
billion
pounds
of milk per year.



A Virginia Tech student milks cows at the new Dairy Science Complex – Kentland Farm.

Living the Legacy – 4-H FOREVER

After 95 years, Virginia's State 4-H Congress remains the premier 4-H event, drawing more than 450 young adults from across the commonwealth to the campus of Virginia Tech for four days of learning, leadership, and fun. "4-H Congress provides members an opportunity to develop life skills and hone their leadership abilities while forging new friendships," said Tonya Price, an Extension 4-H youth development specialist.

This year's theme — Living the Legacy – 4-H Forever — drew upon the history of 4-H and its power to assist teens in developing leadership, citizenship, and life skills through hands-on educational programs.

During congress, delegates have the opportunity to compete in events like food challenges and extemporaneous speaking contests. They can also attend workshops to learn more about 4-H competitions like the electric challenge or cattle working. And while at congress, delegates participate in a service-learning project.

Workshops led by Virginia Tech faculty members allow teens to explore career paths in animal science, STEM, leadership, citizenship, healthy living, and environmental science. Sessions offered included Drones and Other Unmanned Aerial Vehicles, National Weather Station Tour and SKYWARN Training, So What's It Like To Be a USDA Veterinarian?, and Fashion Merchandizing, to name a few.

Congress delegates also learn about educational opportunities at Virginia Tech and Virginia State University. They visit with college representatives to learn about career paths they could pursue. 4-H Congress Coordinator Sam Fisher said that during the college/career tracks, 4-H'ers learn what college truly can offer them.

"They discover things about colleges and majors that they didn't even know existed," Fisher said.

Delegates, who submitted applications and were selected, interviewed to represent Virginia 4-H at National 4-H Congress in Atlanta. As part of the process, youth present portfolios of their 4-H experience. The 21 delegates selected this year have an opportunity to interact with and learn from other outstanding 4-H members from across the country.

The Virginia 4-H Cabinet is elected during state congress. Cabinet members plan events like 4-H State Congress, and they work to enhance the public's understanding of 4-H.

Abby Durham, from Stafford County, was elected to the cabinet representing the Northern District this year. Durham, who has been in 4-H for seven years, is considering a career in agricultural law or political science. She wants to further involve herself in 4-H, carrying on the family tradition — her parents were also 4-H'ers.

"4-H plays a huge role in my life," Durham said. "I've always wanted to be a 4-H'er. I don't know what I would do without it now. I really enjoyed having the opportunity to interact with other delegates from across the state."



Congress delegates enjoy practicing food safety skills and learning about electricity and circuits during workshops.

During the Drones and Other Unmanned Aerial Vehicles workshop, participants view a demonstration of drone technology.



Digital media program empowers youth to express themselves

In the digital age, computers, smartphones, tablets, and other electronic devices are becoming more prevalent every day. So how do we foster creativity, compassion, and curiosity in a time when young people are glued to their screens? We teach them how to use that technology for something more.

Virginia 4-H's Virginia Youth Voices program empowers youth to use technology to explore and express their perspectives on issues impacting them and their communities. Participants create compelling videos, animations, photo essays, presentations, music, and other works that contribute the essential perspectives of youth to critical topics and inspire new solutions to long-standing problems.

"With greater creativity and belief in their own abilities, young people will be more engaged in their education and better prepared for a fast-changing global economy," noted Hermon Maclin, Virginia Cooperative Extension 4-H youth development agent in Prince George County and a lead educator for the program.

Kathleen Jamison, 4-H Extension specialist, initiated the program when she was awarded an Adobe Youth Voices grant through the National 4-H Council about five years ago. Since its inception, the program has grown to include a partnership with Virginia State University's mass communications department and has involved fifteen 4-H Extension agents and staff members and hundreds of youth across Virginia.

"With assistance from the state 4-H office, the Virginia Youth Voices program will be sustained for youth who have something important to say through digital media. As the program continues to grow, higher visual and digital media impact is expected," said Jamison.

One success story to come from the program involves two 4-H members from military families stationed at Fort Lee in Prince George County. Renee Whitener and Madison Kirkland were selected by Adobe to receive an all-expense-paid trip to Santa Clara, California, to attend the 2013 Adobe



Virginia Youth Voices educators teach teens about video production, including how to use cameras and lights.

Youth Voices Summit along with young people from around the world. Both girls appeared in and helped create a video called "Something Fearless."

"It was a fun and challenging experience," said Kirkland. "I had lots of fun working with my best friend and learning new skills."

But the video is not the end result. "It's about how the creative process sparks a young person's ability to solve problems using creative skills and powerful storytelling techniques," explained Maclin.

The digital projects are showcased at the Virginia Youth Voices Red Carpet Event, held annually at the Science Museum of Virginia in Richmond. It serves as the culminating event for the program and mirrors the Academy Awards, complete with Oscars. Faculty members and students from Virginia Commonwealth University's mass media department critique the projects.

Seven clubs were recognized at the 2015 Red Carpet Event. The Keystone and Torch 4-H Club from the Fort Lee Youth Center received the Oscar for the best inspirational video. The video, "I'm Different and It's OK," can be viewed along with other projects on the Virginia Youth Voices Facebook page.

"The video about being different brought us closer together," said Victoria Barnes, a member of the Keystone and Torch 4-H Club. "It helped us become more confident, and we were able to tell our stories."

4-H'ers are
2.3times



more likely to be physically active and are nearly **two times** more likely to plan to go to college than their peers.



The Keystone and Torch 4-H Club production team celebrates after receiving a 4-H Oscar for its digital media project, "I'm Different and It's OK," at the 2015 Virginia Youth Voices Red Carpet Event.

“With assistance from the state 4-H office, the Virginia Youth Voices program will be sustained for youth who have something important to say through digital media.”

— Kathleen Jamison
4-H Extension Specialist



Adding value pays off for Virginia cattle producers

With more than 1.4 million head of cattle across the commonwealth, Virginia's beef cattle industry is big business.

But while the cattle market has been favorable over the past few years, producers understand the need to continually improve their operations to stay competitive.

The Virginia Quality Assured certified feeder cattle program provides producers with the means to add value to their cattle, enabling them to receive premium prices for their calves.

Virginia Cooperative Extension partnered with the Virginia Cattlemen's Association to develop and administer the program, which encourages the use of research-based health and best management practices for feeder cattle. Participants are eligible to market feeder cattle through the Virginia Quality Assured initiative.

The program, which started in 1997, has marketed more than 125,000 head of feeder cattle, resulting in \$6.4 million in value-added income for Virginia's beef cattle producers.

"Having the ability to add value to Virginia's beef cattle operations is critical to the sustainability of Virginia agriculture and rural communities," said Scott Greiner, Virginia Cooperative Extension beef cattle specialist.

The initiative would not prosper without the coordinated efforts of all parties involved.

"Part of what makes this program so successful in our area is the collaboration among Extension agents, the Virginia Cattlemen's Association, Virginia Department of Agriculture and Consumer Services, Abingdon Feeder Cattle Association, Tri-State Livestock Market, and the producers," said Scott Jessee, agriculture and natural resources Extension agent in Russell County. "We all have a role to play."

Throughout the year, Jessee and his fellow Extension agents and specialists provide producers with valuable health, management, genetic, and marketing information. This education is offered through a variety of methods, including field days, on-farm visits, group meetings and workshops, demonstrations, and distance learning. Extension agents also serve as third-party verifiers to ensure that producers have followed the required vaccination and management protocols.

The eligible animals are evaluated and described by VDACS livestock marketing representatives. The cattle are then grouped by similar traits and offered for sale in truckload lots at scheduled intervals on the Virginia Cattlemen's Association Tel-O-

Since 1997, the program has contributed

\$6.4 million

in value-added income for Virginia's beef cattle producers.

“Having the ability to add value to Virginia's beef cattle operations is critical to the sustainability of Virginia agriculture and rural communities.”

— Scott Greiner
Virginia Cooperative Extension
Beef Cattle Specialist

Auction. The livestock market provides the facility and equipment to sort, weigh, and load out cattle.

Philip Bundy, a Russell County cattle producer and president of the Abingdon Feeder Cattle Association, has been marketing cattle through the program since it started in Southwest Virginia 11 years ago.

"We've built a reputation of providing high-quality, weaned feeder calves," said Bundy. "Our cattle are highly sought after, and we are now outselling western cattle."

The program has taken off in the past couple of years. In 2014, producers in Southwest Virginia more than doubled the number of cattle marketed through the program in 2013.



Conference focuses on beef cattle health

Virginia Cooperative Extension and the Virginia-Maryland College of Veterinary Medicine teamed up to host a record-setting beef cattle conference in 2015.

The Virginia Tech Beef Cattle Health Conference attracted more than 300 participants — double that of 2014's attendance. It offered a daylong series of lectures, presentations, and workshops designed to give beef cattle producers more strategies to improve the health of their herds.

Dr. John Currin, clinical associate professor of production management medicine in the Department of Large Animal Clinical Sciences, was one of a half dozen veterinary college faculty members who taught producers about a wide range of beef cattle health issues. Currin's presentation addressed the affordability of calves and feed.

Other presentations covered current issues with cattle poisons, the cost to create a pregnancy, stretching hay, water-related cattle disease, and current health issues. In addition, Jon Vest, a Virginia Cooperative Extension agent in Floyd County, and Terry Slusher, a beef cattle producer in Floyd, spoke about making improvements to handling facilities.

The afternoon featured rotating 30-minute labs at Virginia Tech's Alphin-Stuart Livestock Arena that covered rumen anatomy, the cost of feed, warming a cold calf, and body condition scoring. The presenters were faculty members and veterinary residents on the college's production management medicine team.

Dr. Hollie Schramm, clinical instructor of production management medicine, gives a presentation on rumen anatomy at the Virginia Tech Beef Cattle Health Conference.

According to Currin, the conference also gave veterinary students an opportunity to gain hands-on experience with beef cattle health. Approximately 30 veterinary students attended the conference, while 14 fourth-year students, in their clinical training year, assisted with the afternoon labs.

"Conferences like these are a great opportunity for us to share the knowledge of Virginia Tech with producers so they can continue to thrive," said Currin.

For producers, the conference met the requirements for recertification with the Virginia Beef Quality Assurance program, which has certified about half of Virginia's cattle and added millions to the value of Virginia's certified farms.

Exploring how industrial hemp can benefit the commonwealth

Starting in the 2016 growing season, Virginia Tech will begin conducting research on a crop that was part of the very fabric of the Jamestown settlement and may once again become a part of the commonwealth's agricultural portfolio: hemp.

Following a 2015 state law that allows institutions of higher education to grow industrial hemp for research purposes, the university began researching the manner in which the crop can be grown and assessing the economic impact it could have on the commonwealth.



"This is a great opportunity for the university to help farmers develop a new crop that can increase their revenues even further," said Saied Mostaghimi, director of the Virginia Agricultural Experiment Station and associate dean of research and graduate studies for the College of Agriculture and Life Sciences. "This is also a great example of how our researchers work in conjunction with Virginia Cooperative Extension to the benefit of the state."

U.S. retail sales of hemp-based products could exceed

\$300 million

annually, according to industry reports.

As it does with any new crops, the university will test growing conditions at various locations around the state to determine the best ways to plant, fertilize, and harvest hemp. For the first year, all planting will be done on university-owned or -managed land.

Once the critical agronomic factors are determined, the information the scientists glean will be shared with growers through Virginia Cooperative Extension.

At the same time, research will be conducted on potential uses for hemp, which could range from food supplements to biofuels. The crop's economic impact on the state will also be assessed.

U.S. retail sales of hemp-based products could exceed \$300 million annually, according to industry reports. Most of the 55,700 metric tons of hemp produced around the world comes from China, Russia, and South Korea, so this program provides an opportunity for Virginia to enter a global market.

Agency 229 is...

Innovative research

Virginia Agricultural Experiment Station's network of faculty members in Blacksburg represents three colleges — the College of Agriculture and Life Sciences, the College of Natural Resources and Environment, and the Virginia-Maryland College of Veterinary Medicine. The 11 Agricultural Research and Extension Centers located across the state support basic and applied research activities on agricultural, environmental, natural, and community issues related to the future needs of Virginia, the nation, and the world.



Expanding education

Virginia Cooperative Extension leads the engagement mission of Virginia Tech and Virginia State University — the commonwealth's land-grant universities. By building local relationships and collaborative partnerships, Extension provides practical education you can trust to help people, businesses, and communities solve problems, develop skills, and build better futures.



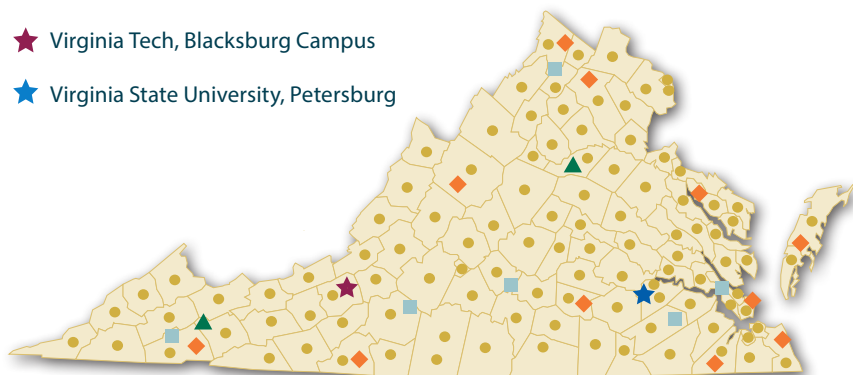
A local presence

Virginia Cooperative Extension offers resources in 107 offices located in every county and 12 cities in Virginia. It is a product of cooperation among local, state, and federal governments in partnership with tens of thousands of citizens who — through their local Extension Leadership Councils — help design, implement, and evaluate Extension's needs-driven programs.



We have the commonwealth covered

- 107 Local Extension Offices
- ◆ 11 Agricultural Research and Extension Centers
- ▲ 2 Departmental Research Centers
- 6 4-H Educational Centers
- ★ Virginia Tech, Blacksburg Campus
- ★ Virginia State University, Petersburg



Virginia's dairy industry is valued at more than

\$480 million.



New dairy complex boosts industry

Virginia's dairy industry is valued at more than \$480 million and is the state's third most valuable agricultural commodity.

To serve this industry, Virginia Tech researchers and Virginia Cooperative Extension agents and specialists work in concert to provide the most current and relevant knowledge to producers around the state.

Now, they have a new state-of-the-art dairy facility where they can help the industry grow even more.

This summer, the College of Agriculture and Life Sciences completed construction of the \$14 million Dairy Science Complex – Kentland Farm.

"The new facilities provide great opportunities for students desiring a hands-on, experiential education, and they will also allow the faculty to conduct innovative research that is important for the dairy industry," said Alan Grant, dean of the college.

Features of the high-tech facility include an 11,900-square-foot milking parlor with a double-12 parallel milking system and computerized milk-monitoring system, a 46,000-square-foot freestall barn where the 232 milking cows will be housed, a modern waste management system, a special-needs heifer barn, and a preweaned calf facility.

This first phase of construction was funded by Virginia Tech with nongeneral funds. The Virginia General Assembly has approved \$7.6 million in funding for Phase II of the dairy complex, which will include a demonstration facility located near Plantation Road, an applied reproductive physiology facility adjacent to the Virginia-Maryland College of Veterinary Medicine, and an intensive metabolism research facility at the Kentland Farm complex.

Celebrating a decade of Virginia Master Naturalists



This year marks the 10th anniversary of the Virginia Master Naturalist program. In the decade since the national program started in the commonwealth, the organization has trained several thousand Master Naturalists, who have contributed 526,583 hours of volunteer service — the equivalent of well over 250 years of full-time employment. Its initial 10 chapters have grown to 30, with each making a significant positive impact on Virginia's natural resources.

Virginia Master Naturalist volunteers provide education, outreach, and service to support Virginia's natural resources and public lands. Their time is calculated to be worth nearly \$12.4 million to date.

"About 3,500 Master Naturalists have been trained since the program began in Virginia," said Program Coordinator Alycia Crall. "Many of them are still active volunteers, donating at least 40 hours of work each year."

Master Naturalists have contributed to more than 70 scientific studies, which have advanced knowledge about Virginia's natural resources. Their study subjects range from frogs to American chestnuts to spring beauty flowers to osprey. The volunteers have also cared for more than 2,500 acres of public lands by removing non-native species, maintaining trails, and planting native flowers.

The Virginia Master Naturalist program is open to anyone who wants to learn more about nature. Participants start out by completing 40 hours of training offered through a local chapter; an additional eight hours of advanced training are required each year. The volunteers learn basic ecology and scientific principles as well as ornithology, geology, botany, and zoology.

"I like marking the seasons by seeing what's happening out there," said Brenda Graff, a Master Naturalist in Christiansburg. "I especially like collecting data that can help the environment."

www.virginiamasternaturalist.org

The Virginia Master Naturalist program is jointly sponsored by Virginia Cooperative Extension and the Virginia departments of Conservation and Recreation, Environmental Quality, Forestry, the Virginia Institute of Marine Science's Center for Coastal Resources Management, and Game and Inland Fisheries, as well as the Virginia Museum of Natural History. The program is based in the Department of Forest Resources and Environmental Conservation in Virginia Tech's College of Natural Resources and Environment.

Virginia Master Naturalists learn tree identification as well as many other skills in their basic training that they apply to service projects to benefit Virginia's natural resources.



Master Naturalists contributed

526,583
hours of
volunteer service
in the last 10 years.





Virginia forest assessment provides good news with a cautionary note

Growth in Virginia's forests exceeds harvests, which is good for carbon sequestration and forest sustainability according to the Center for Natural Resources Assessment and Decision Support in the College of Natural Resources and Environment. However, the center's assessment of the commercial wood supply in Virginia revealed significant pressure on younger trees commonly used for manufacturing paper, wood pellets, and some wood composites.

More than 60 percent of Virginia's land is forested. Forests provide highly valued recreational and environmental resources, and forest-related industries account for 104,000 jobs in the state.

The center focused its research on the privately owned forest resource, which provides more than 95 percent of the state's commercial wood supply. Of Virginia's 914 million tons of wood on private lands, about 92 percent is potentially available for commercial purposes.

"Virginia's private forests annually grow 86 percent more wood than is harvested, leading to increasing inventories and ongoing removal of carbon from the atmosphere in excess of what is used for products and energy," said Stephen Prisley, center director and professor of forest

inventory and geographic information systems in the Department of Forest Resources and Environmental Conservation.

However, for smaller trees, harvest exceeded growth by 2.4 million tons in 2011. Demand for pulpwood is increasing owing to its use as a renewable energy source, such as feedstock for electricity production both in Virginia and overseas.

"Carbon storage in Virginia's forests is increasing annually at a rate that is more than enough to compensate for wood used for bioenergy, which releases carbon," said Prisley.

"Nonetheless, if demand for one portion of the forest resource continues to exceed the growth of that resource, supply shortages will lead to higher costs for buyers and impacts on other related resources," Prisley continued. "For example, increased competition for pulpwood means that buyers may have to seek out higher-priced trees that are suitable for lumber, impacting those markets as well."

The assessment report, which has been provided to the center's partner organizations, including industry, state, federal, and private entities, points to opportunities that exist for active forest management, accelerated reforestation, and increased outreach and support for private

Forest-related industries account for
104,000 jobs
in the state.

Stephen Prisley, associate professor, Forest Inventory and GIS, Center for Natural Resources Assessment and Decision Support, with students in Newport, Virginia, and at Pandapas Pond in Blacksburg.

forest landowners to mitigate the long-term impacts of this situation.

"The Virginia Department of Forestry has been leading the charge for natural resources sustainability for more than 100 years, and we believe this initial assessment is a good first step," said the state forester of Virginia, Bettina Ring. "Virginia's forests are healthy, abundant, and provide many environmental and economic benefits. We look forward to continuing to work with the researchers at Virginia Tech to develop better estimates of the status of the forest resource over the next few years."

“Virginia's forests are healthy, abundant, and provide many environmental and economic benefits. We look forward to continuing to work with the researchers at Virginia Tech to develop better estimates of the status of the forest resource over the next few years.”

— Bettina Ring
State Forester of Virginia



New building cooks up industry engagement

The faculty members housed in the newly constructed Human and Agricultural Biosciences Building 1 facility haven't wasted any time in establishing symbiotic relationships with industry. The space has allowed collaborations on research that provide the university with advanced tools while delivering world-class, faculty-led research to industry leaders.

One company that has partnered with Virginia Tech is DuPont Teijin Films. Joe Marcy, department head and professor of food science and technology, brokered the arrangement, and now a gleaming, German-made Multivac R120 food packager graces the pilot plant space on the ground floor of HABB1.

DuPont Teijin Films is partnering with Virginia Tech to test the performance of various food-packaging films before they roll out the machinery on their own production lines. The partnership saves DuPont Teijin Films valuable time and money because the company doesn't have to cut into its own production time.

As a client, DuPont Teijin Films can also bring its own chefs and marketing staff to the facilities at Virginia Tech and have unfettered access to the equipment they are working with for research and development purposes.

DuPont Teijin Films is partnering with Virginia Tech to test the performance of various food-packaging films before they roll out the machinery on their own production lines.

"I get a chance to work with decision-makers every day and to expose them to the capabilities that Virginia Tech has to offer," Marcy said.

Virginia's manufacturing industry contributes \$34 billion to the gross state product and accounts for more than 80 percent of the state's exports to the global economy.

"The real value is the exposure to the food industry and the people I want to engage with," said Marcy.

For Marcy, the area in HABB1 is more than a pilot plant — it's an industry engagement space.

It's all part of the vision Marcy has for creating an "Innovation Collaboratory" with packaging machinery, a full test kitchen, and a food science laboratory where all manner of commercial cooking methods can be tested — everything from conventional home oven

Virginia's manufacturing industry contributes

\$34 billion

to the gross state product.

Virginia Tech and DuPont Teijin Films have teamed up to create an environment in the new Human and Agricultural Biosciences Building 1 where companies can test the best ways to prepare and package foods.

cooking to sous vide, a method where food is cooked over a long period of time at a low temperature in vacuum-sealed plastic.

The space is also an incubator for other research opportunities, several of which are already in the hopper, like the new beer brewing equipment that will soon be online.

And Marcy won't be stopping there. The wide-open space of the plant can be configured to whatever may present itself as a research opportunity that can benefit the food industry.





Kiho Lee, who is working with pigs to increase muscle mass, is one of the many scientists working in agricultural biotechnologies and biosciences.

Virginia Tech leads the way in ag biotechnology initiative

Agricultural biotechnology is an emerging industry that blends the artistry of molecular science with agricultural production to boost productivity and improve plants, animals, and microorganisms using techniques that are not possible with traditional crossing of related species alone.

The industry received a shot in the arm when Gov. Terry McAuliffe announced plans for a Virginia Bioscience Initiative in 2014. The effort would leverage the state's research universities and the private sector to catalyze the growth of the emerging industry in the commonwealth.

The ag bioscience initiative is part of Gov. McAuliffe's broad effort to create a New Virginia Economy that seeks to overhaul the state's dependency on what has traditionally been federal funding. The program's goals include raising the profile of the Virginia bioscience industry, enhancing incentives for bioscience businesses, using existing assets to create new opportunities, developing a bioscience workforce, and promoting commercialization of university research.

And the College of Agriculture and Life Sciences is well-positioned to meet the needs of the nascent industry.

Faculty members in the college perform myriad ag technology and biosciences research programs that run the gamut from developing alternative sources of energy to increasing swine production.

In the Department of Food Science and Technology, Assistant Professor Andrew Neilson is working on infusing food with nutraceuticals like cocoa flavanols — compounds that greatly lower blood sugar levels and prevent weight gain in mice that are fed a high-fat diet.

Virginia Tech biological systems engineering graduate Joe Rollin and Professor Percival Zhang are creating revolutionary alternative energy systems using the abundant agricultural resource of corn stover to create zero-emissions hydrogen fuel.

"As Virginia's leading research university, Virginia Tech is already at the forefront of a lot of agricultural biosciences research and development," said Saied Mostaghimi, associate dean of research and graduate studies in the college. "We look forward to helping grow this industry in the commonwealth even further."

Less weeding, more feeding

Soybeans are a major crop in both Virginia and North Carolina, but money spent on weed control is choking out about \$40 million of profits per year for farmers in each state.

A collaborative grant between Virginia Tech and North Carolina State University seeks to eradicate weeds such as Italian ryegrass, wild radish, common ragweed, and Palmer amaranth that are common to both states.

The grant money is being focused on environmentally friendly ways to control weeds that won't contribute to herbicide resistance.

"Herbicide resistance prevalent in our region is just shy of doubling the weed control costs of production," said Michael Flessner, assistant professor of plant pathology, physiology, and weed science and Extension specialist. "This is a way to not only combat the weeds, but to also keep the problem from becoming worse," said Flessner.

Flessner estimates it costs farmers in the region an additional \$60 to \$100 per acre to hand-pull the weed Palmer amaranth in infested fields.

He is working in conjunction with Wes Everman, assistant professor of crop science at North Carolina State University, to research the effects of destroying the seed by crushing it at harvest or by carrying away the postharvest residue, thereby taking the seeds out of the cropping system before they become a problem in the field.

Research at the University of Arkansas is already showing promise using these methodologies. One study reduced the time required to hand-pull weeds from 205 man-hours to six man-hours over a period of just two years.

Assistant Professor of Plant Pathology, Physiology, and Weed Science Michael Flessner is helping Virginia farmers by investigating how to control weeds before they become a problem at harvest.



Workshops teach families the necessary skills to transition land

Fourth-generation farmers Mary and A.C. "Corky" Shackelford Jr. have more than 360 acres of land, and they aren't getting any younger. With three children as well as farm employees, they needed to figure out how to distribute their assets — a common problem as farm families age.

Agriculture and natural resources Extension agents like Amy Gail Fannon, Adam Downing, and Peter Callan teach land-transitioning workshops to help families pass on their land, whether it's farmland or forestland.

The workshops discuss legal issues and tactics for communicating with family members and obtaining a power of attorney. Agents engage lawyers, certified public accountants, and other professionals as guest speakers to provide insight and real-world examples of the process, while participants have an open environment to ask questions.

As the result of workshops in Lee County, 66 percent of attendees said they would start the farm transition planning process, and 90 percent said they would seek professional assistance with financial and retirement planning.

Downing teaches workshops geared more to forestland owners. He says that land transitioning isn't just about perpetuating land ownership; it is also part of the equation keeping families together through generations. Teaching workshops is one of the most impactful things he does because the land transition process impacts the future so directly.

Since 2009, 159 forestland owners with nearly 60,000 acres have completed the annual two-day Generation NEXT short course that is co-sponsored by Virginia Cooperative Extension and the Virginia Department of Forestry.

"Follow-up surveys reveal that within six months of participation, 75 percent have begun estate planning," said Downing.

"Participants also report significant financial savings in legal fees and potential estate taxes as a result of this program."

Callan has worked to evolve his farm transition workshops over the years, making them shorter to fit the needs of participants. His workshops start with a discussion of communication issues between family members.

The Shackelford family went to Callan's class after hearing about it through their local Extension office.

"Neither of us is getting any younger, and we want to see our farm continue beyond our time," Corky Shackelford said.

According to the Shackelfords, the lawyer who discussed partnerships and corporations was the most helpful part of the workshop. Since then, they continue to follow Callan's advice of holding family meetings to discuss the farm.

"We would've never thought about how to transition our farm if it wasn't for that class," said Mary Shackelford.



The programs are funded in part by the Virginia Department of Agriculture and Consumer Services Office of Farmland Preservation with proceeds from the sale of "Farming Since 1614" license plates. Since 2008, money from the specialty plates has been used for nearly 30 farm transition workshops.





New Healthy Beverage Index may help consumers improve cardiometabolic health

There may be a better way to think about daily drinking habits that impact health conditions such as obesity and diabetes, according to a new study by Virginia Tech researchers.

The researchers have developed the Healthy Beverage Index — a scoring system to evaluate the healthiness of what and how much people drink each day. They found that a higher index score correlates to better cholesterol levels, a lower risk of hypertension, and, in men, lower blood pressure.

In the future, consumers and health care practitioners may be able to access the index online or as a mobile app to evaluate beverage intake quality.

“The goal was to develop an index that would help consumers by providing specific information about the types and amounts of beverages that could be consumed to promote optimal health,” said Brenda M. Davy, a professor of human nutrition, foods, and exercise in the College of Agriculture and Life Sciences and an affiliated faculty member in the Fralin Life Science Institute.

Davy developed the index with colleague Kiyah J. Duffey, an adjunct faculty member in human nutrition, foods, and exercise and director of global scientific affairs at LA Sutherland group.

“With various recommendations for beverage intake and recent attention on sugar-sweetened beverages, we thought consumers might be wondering what they should be drinking,” said Davy, who is also an affiliated faculty member in the Fralin Translational Obesity Research Center. “We

know that consumers want guidelines that are specific to the types and amounts of foods and drinks to consume.”

Using the index as a guide, consumers can earn up to 100 points by engaging in healthy activities such as consuming water for at least 20 percent of their daily fluid intake or consuming less than 10 percent of their daily calories in drinks. Overall, a higher score indicates a healthier beverage pattern and, ultimately, better health.

Davy and Duffey developed the index based in part on the 2010 U.S. Dietary Guidelines for Americans, which include recommendations for total daily energy coming from drinks, daily fluid requirements, and limits for various kinds of drinks, like milk, juice, soda, coffee, and tea.

Virginia Tech contributes to record agricultural export number

Agricultural and forestry exports have been on the rise in the commonwealth for the last three years and most recently topped out at more than \$3.35 billion.

Soybeans, lumber, tobacco, wheat, and pork — all commodities for which Virginia Tech provides crucial research and Extension services — are among the state’s top exports year after year.

That record-breaking dollar figure is built on staples of the export market, but it has also continued to climb because of breakthroughs into prestigious luxury markets, like wine. In a cultural coup, Virginia wine was exported to the United Kingdom for the first time two years ago, a feather in the cap of the state’s winemakers and a testament to the craftsmanship and quality of the commonwealth’s wine industry that is flourishing with the help of research and Extension.

Production of new wheat varieties through science-based research at Virginia Tech has also been a boon for Virginia’s grain exports and its reputation as a grain-producing state. Faculty members in the Department

of Crop and Soil Environmental Sciences have focused on the identification, genetic characterization, mapping, and utilization of durable disease-resistant genes to make small-grain production in Virginia and the Mid-Atlantic more profitable.

Forests provide highly valued recreational and environmental resources, and forest-related industries account for 104,000 jobs in the state and \$17 billion in exports. Virginia Tech is helping to keep forest products profitable through forest management research that assesses sustainability efforts. Research in the college has shown that more intensive management will dramatically increase forest productivity.

All of these products are celebrated annually at the Governor’s Conference on Agricultural Trade in Richmond. This year, Virginia Tech President Timothy D. Sands told the audience made up of agricultural movers and shakers that the university was there to partner with industry in the challenge of feeding an ever-growing global population.

“Virginia Tech and other land-grant partners, including Virginia State University, are in a great position to be a partner with all of you to take advantage of this opportunity going forward,” he said.

Agricultural and forestry exports have been on the rise in the commonwealth for the last three years and most recently topped out at more than

\$3.35 billion.



Initiative gets SNAP consumers to farmers markets

In Virginia, more than 3.1 million households are food insecure, meaning they do not have reliable access to sufficient quantities of affordable, nutritious food.

Virginia Cooperative Extension is working to alleviate food insecurity through its Family Nutrition Program Food Access and Availability Initiative. The project focuses on increasing access to local food systems, especially through farmers markets and gardening projects.

"We want to raise awareness that SNAP benefits, or food stamps, can be redeemed at many farmers markets around the commonwealth. We also want to support markets in outreach and educational efforts for SNAP participants," said Meredith Ledlie Johnson, a project associate for the Family Nutrition Program who manages the Food Security Project.

In 2014 Johnson and her colleagues developed an online marketing toolkit that allowed farmers market managers to download an Electronic Benefits Transfer startup manual and marketing materials such as posters, postcards, and recipes they could use to promote the program.

"It falls to the market managers to be creative. Even to accept SNAP they must apply to the federal government for approval and then apply to state social services for an EBT machine and set up the accounting," said Johnson. "They also have to secure their own SNAP incentive funds."

Managers must apply for grants from organizations that offer funds for preventive care, such as nonprofit hospitals, churches, and credit unions. These grants are used to match the U.S. Department of Agriculture SNAP benefits to give consumers more buying power at the markets. Currently 81 farmers markets accept SNAP benefits out of approximately 240 markets in Virginia.

Family Nutrition Program staff, student interns, and volunteers also provided cooking

demonstrations at 23 of the farmers markets that accept the EBT cards and reached more than 2,300 people in 2014 with simple, low-cost ideas for preparing local and seasonal produce. Recipes distributed during these demonstrations included information about local FNP adult nutrition classes.

In 2015 the Food Access and Availability Initiative expanded to include billboards, bus signs, and posters that are placed in food-insecure neighborhoods that advertise the use of EBT cards at farmers markets. The project is also partnering with local Virginia Cooperative Extension staff and volunteers to provide additional promotions and cooking and gardening demonstrations at farmers markets across the commonwealth to increase visibility of how Extension provides broad programming from farm to fork.

Johnson wants SNAP consumers to know that despite perceptions that farmers markets are expensive, shopping at farmers markets can help them stretch their food budget because so many markets provide matching funds to SNAP consumers. Also, buying locally often means they are getting fresher products that taste better.

"Introducing SNAP consumers and farmers market shoppers as a whole to new foods and offering them chances to taste new ways to cook them often encourages them to eat foods they thought they didn't like. Also, when kids see the vegetables fresh from the field and not coming out of a can, they want to try them," said Johnson.

According to Johnson, millions of dollars each year are remitted to families through the SNAP program with less than 1 percent being spent at farmers markets.

"We have a huge opportunity to not only help SNAP consumers purchase and consume more fresh fruits and vegetables, but we can also help promote local agriculture and capture some of these funds locally," said Johnson.

In Virginia, more than

3.1 million

households are food insecure.

The Family Nutrition Program Food Access and Availability Initiative is partnering with local Virginia Cooperative Extension staff and volunteers to provide cooking and gardening demonstrations at farmers markets across the commonwealth. Their presentations on container gardening point out that SNAP benefits can be used to purchase food-bearing plants.



New program helps community members access fresh produce

What's for dinner? For some, making a quick run to the grocery store for fresh produce is not an option. In Suffolk, Virginia, some families must travel as far as 25 miles to buy fresh produce.

In short, they are in a desert — a food desert.

The U.S. Department of Agriculture defines food deserts as “low-income communities without ready access to healthy and affordable food.” Food deserts can be attributed to an absence of grocery stores, farmers markets, and healthy food providers in an area.

“It's very alarming when we have people going to North Carolina because groceries are so far away from them,” said Marcus Williams, an agriculture and natural resources Extension agent in Suffolk.

Extension agents like Williams want to reduce the prevalence of food deserts in Virginia. With the help of the Obici Healthcare Foundation, Williams and his colleagues from Virginia Beach, Newport News, Virginia Tech, and Virginia State University have started an initiative to help those living in food deserts.

To date, Extension has held four events in Suffolk to teach community members about nutrition, finance, food identification, and cooking. The grocery store chain Farm Fresh partnered with Extension to provide gift cards to participants, and the American Red Cross supplied cookbooks and educational materials.

During each event, participants learn about food deserts and what is being done in their communities to improve access to fresh foods. Through hands-on activities, participants also learn about vegetables, nutrition, cooking, and finances. During lunch they have an opportunity to ask questions and network with other participants and experts. At the conclusion of the event, participants are given fresh produce along with a Buy Fresh Buy Local guide, a colander, measuring cups, and the American Red Cross cookbook.



During four food desert events, more than 4,000 pounds of produce were distributed to 176 people.

As community members become more educated about buying fresh, local produce, local farms are also seeing benefits. Because of these events, four local farmers have seen 10 percent increases in fruit and vegetable sales.

Over time, Williams would like to see these programs become self-sufficient. He also wants to provide even more programs and resources to the communities. One idea is to create a mobile farmers market to bring produce to food deserts throughout the city. This form of food hub would in turn help local farmers have an outlet to sell their fruits and vegetables at reasonable prices.

Extension agents reach out to unlicensed child care providers

Caring for children can be a stressful and difficult job.

But, when a child care provider tries to care for too many children, accidents can happen. According to a study by The Washington Post, about 60 children died in Virginia day care settings between 2004 and 2014. Nearly 75 percent of these deaths occurred at unlicensed homes, where child care providers faced no inspections or background checks.

As a result of these tragic accidents, several new, stricter state laws were passed in Virginia in 2015. As this issue was recognized, Karen DeBord, Virginia Cooperative Extension family and human development specialist, saw a need to reach out to and provide education to unlicensed child care providers.

“Very often, people start agreeing to care for children and unknowingly stretch the

limits. Families may ask them to care for their child, and caring adults open their doors and hearts to help but end up taking on too many children,” DeBord said.

Virginia Cooperative Extension's new child care database enrolls unlicensed child care providers, offers free educational materials to improve child safety, and encourages appropriate activities for learning. The goal of this initiative is to locate unlicensed child care providers and supply them with resources ranging from school readiness activities and day trip ideas to safety checklists and nutritional information, while building trust with the providers.



The website directs child care providers to a survey asking for general information, such as how many children are in their care, the children's ages, and the provider's name and email address.

Once Extension agents learn more about the child care providers from the information they provide on the survey, agents can supply them with age-specific resources for the children under their supervision. DeBord says the agents offer school preparedness and literacy exercises for preschool-aged children.

“We want children to be safe and ready for school,” DeBord said. “No matter the season, we want them to be spending their time involved in healthy learning activities.”

Extension agents are working with state child care organizations and agencies in order to spread the word to those interested in the free resources Extension has to offer. Those who take the survey, which can be found at <http://childcareva.org>, have access to the website's information and resources.

History provides backdrop for pesticide training

Though the Virginia Tech Pesticide Program was established in 1964, Virginia's history of pesticide safety education goes back to the late 1800s. Today the Virginia Cooperative Extension program trains pesticide applicators by blending history with modern safety measures.

VTTP trains more than 20,000 agricultural producers and pest managers in 27 different certification categories of private and commercial pesticide application during a reoccurring four-year cycle.

In Virginia, private and commercial pesticide applicators must be certified using a 14-point core curriculum. The training is based on a 300-page core manual that's approved by its partner, the Virginia Department of Agriculture and Consumer Services. VTTP also offers 22 commercial applicator training manuals, training aids, online training, and onsite instruction led by local Extension agents. Through a train-the-trainer workshop held every September, VTTP provides agents with the most up-to-date information about pesticide application technology, regulations, and safety.

"Agents are the key educators in the program," said Mike Weaver, program director. "They provide training in more than 100 localities and host or support over 200 workshops annually. The program wouldn't work without their dedication, talent, and hard work."

Weaver often shares Virginia's rich history in pesticide education during pesticide safety education workshops.

For example, in 1889 William Bradford Alwood went to an Albermarle Fruit and Grape Growers meeting and warned members about the use of arsenic and other poisons on their crops. In 1892 Alwood and Walker Bowman, Virginia's first pesticide residue chemist, addressed the public's fear of pesticide residue on grapes by testing them and finding them safe to eat. These two men became the first pesticide safety educators in the commonwealth. Sharing this information sparks the interest of trainees



An instructor provides participants with a demonstration of advanced sprayer technology that uses pulse modulation to prevent pesticide spray drift.

and shows the significance of pesticide safety education over the years.

Another creative use of history was VTTP's revival of Larry the Label. Larry the Label was a cartoon used by the U.S. Department of Agriculture and national Cooperative Extension Service for public service announcements from the 1950s through the 1970s to warn the public to read pesticide labels.

In July 2014, VTTP launched Larry the Label Jr. on Facebook to once again teach the public about pesticide safety and protecting human and environmental health.

As regulations change over time, keeping people and the environment safe from the misuse of pesticides continues to be the focus of VTTP and Virginia Cooperative Extension.

"We do what we do because it's required, but also because it's the right thing to do," Weaver said.

“Agents are the key educators in the program. They provide training in more than **100 localities** and host or support over **200 workshops** annually.”

— Mike Weaver
Director, Virginia Tech Pesticide Program

Shawn Askew, turfgrass Extension specialist, presents weed identification and management information to Extension agents and turfgrass industry professionals.



By the numbers

Extension and Research Funding

(funding sources for FY2015)

Virginia Cooperative Extension and the Virginia Agricultural Experiment Station received

\$189.5 million

from federal, state, and local governments, as well as from grants, contracts, and other sources.



8.2%

Funds from local government



35.9%

State general funds



9.4%

Federal capacity grants



46.5%

Grants and contracts and other funds



Extension and Research Effort

(full-time-equivalent employees)

Total number of faculty and staff members for research and Extension

878 FTEs

Extension

64%

Virginia Agricultural Experiment Station

36%

Location of Research and Extension Faculty

District offices

2.8%

Virginia Tech campus

32.2%

Agricultural Research and Extension Centers

8.5%

4-H educational centers

2.4%

City and county offices

54.1%

Value of Volunteers

In 2014, Virginia Cooperative Extension had

28,732 volunteers

who assisted Extension staff in delivering educational programs.

They contributed

1,116,859 hours

of service that is valued at **\$27,809,789***.

* Based on a rate of \$24.90 per hour, according to the Independent Sector.

Return on Investment

For every \$1 invested by the state, Agency 229 generates an additional

\$1.78



Youth Programs

More than

202,176

Virginia youth enrolled in 4-H in 2014.

College helps drone industry take off

The College of Agriculture and Life Sciences' Kentland Farm has many of the traditional features you might find at an agricultural research facility. Researchers work on rows of crops to develop better ways to grow a host of vegetables, and cows meander on the hillsides above the brand new Dairy Science Complex. But in the air above them, a new frontier of agricultural science is buzzing.

Drones — also called unmanned aerial vehicles — are a common site at the farm where the Kentland Experimental Aerial Systems Laboratory is located. There, Associate Professor David Schmale flies drones that are sampling microbes floating high above the Earth. Some of these microbes have the potential to cause devastating plant diseases.

Kentland Farm and Schmale are part of Virginia Tech's mission to be a leader in the burgeoning drone industry.

The university is part of the Mid-Atlantic Aviation Partnership, which is developing infrastructure for private companies and other organizations to develop unmanned aircraft.

Introducing commercial unmanned aerial vehicles to U.S. skies could add more than \$13.6 billion to the national economy by the end of the decade, with totals reaching as high as \$82.1 billion by 2025, according to the Association for Unmanned Vehicle Systems International.

"We are transitioning new types of aircraft into the nation's skies that have tremendous potential to help people and create new industry," said Virginia Tech President Timothy D. Sands. "Unmanned aircraft will be useful for agriculture, search-and-rescue missions, disaster response, research, and innovations. With the onset of a new technology, industries are born and new infrastructure evolves — the economic impacts will be enormous."

Introducing commercial unmanned aerial vehicles to U.S. skies could add more than

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to the national economy by the end of the decade.



**For more information about our programs,
visit our websites or one of our local Extension offices.**

Virginia Cooperative Extension
www.ext.vt.edu

Virginia Cooperative Extension local offices
www.ext.vt.edu/offices

Virginia Agricultural Experiment Station
www.vaes.vt.edu

College of Agriculture and Life Sciences
www.cals.vt.edu

College of Natural Resources and Environment
www.cnre.vt.edu

Virginia-Maryland College of Veterinary Medicine
www.vetmed.vt.edu

Additional stories, videos, and links can be found at <http://news.cals.vt.edu/229-report>.