

# THE **magazine**

The background of the entire cover is a photograph of a forest. It shows several tall, slender tree trunks reaching upwards, with a dense canopy of bright green leaves. Sunlight filters through the leaves, creating a dappled light effect. The perspective is looking up from the forest floor.

Volume 20, No. 2

 College of Agriculture,  
Food and Environment

## Partners for Progress

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# The Power of Partnership

Helen Keller said, “Alone we can do so little; together we can do so much.” This issue of The Ag Magazine, with its Partners for Progress theme, focuses on the many effective relationships the College of Agriculture, Food and Environment has built with individuals, organizations, and governments throughout the state. These are research and outreach collaborations with life-changing potential in wide-ranging areas such as health and nutrition, farming production systems, natural resources, and businesses that harness the power of our state's finest minds. Sometimes, it all makes me sit back and marvel at the great good our faculty and staff are doing on so many levels and with so many colleagues.

Without Cooperative Extension, we wouldn't be the University for Kentucky. Family and consumer sciences agents are on the front line in the battle to restore good health to many Kentuckians. By collaborating with professionals from local health departments and hospitals and UK colleges of Medicine, Nursing, and Public Health, we are teaching people about the benefits of good nutrition, exercise, and regular medical checkups. We work with private companies and governments to provide their employees with the benefits of a subscription to a CSA, community supported agriculture. We guide new farmers in safe food production and teach them how to market the products they grow. We work with community leaders to help towns and counties restore their local economy by encouraging out-of-the-box thinking.

In this issue we focus on just a few of our many coalitions. “Allies in the Battle of the ‘Bulge’” shows how Cooperative Extension staff and faculty partnered with the UK College of Public Health to fight the daunting obesity problem in six counties to great success. The story “Blue Water Farms” focuses on our field-scale evaluations of nutrient retention being conducted by UK extension soil scientist Brad Lee, in cooperation with a Western Kentucky farmer and three other organizations. On the other side of the state, the college's Department of Forestry and Natural Resources is working with the Forest Health Research and Education Center (itself a collaborative effort) and the American Chestnut Foundation, among others, to do something that has never been done before—bring a species back from ecological extinction.



On these and so many other projects, we rely on volunteers to lift us up. 4-H'ers give back to their communities through countless service projects every year. The new Kentucky Master Naturalist program joins the established Extension Master Gardener and Master Clothing Volunteer programs to enrich lives through outreach and education. And of course, we could do none of these things without national, state, and private funding. These contributing entities recognize what Ben Franklin knew, that “an investment in knowledge pays the best interest.”

We can no longer rely on old answers to 21st century problems. When we all put our heads together, college and communities in concert, we can and do come up with innovative solutions that I believe will result in Kentucky reaching its greatest potential.

Nancy Cox  
Dean, College of Agriculture  
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Nancy M. Cox, Dean  
Robert Houtz, Associate Dean for Research and  
Director, Kentucky Agricultural Experiment Station  
Larry Grabau, Associate Dean for Instruction  
Gary Palmer, Interim Associate Dean for Kentucky  
Cooperative Extension Service  
Orlando Chambers, Associate Dean for Administration  
Sandra Bastin, Associate Dean for Faculty Resources,  
Planning and Assessment  
Lisa Collins, Associate Dean

Agricultural Communications Services  
Director: Laura Skillman  
Editor: Carol Lea Spence  
Designer: Becky Simmermacher  
Writers: Jeff Franklin, Aimee Nielson,  
Katie Pratt, Carol Lea Spence  
Photographers: Matt Barton, Stephen  
Patton, Katie Pratt, Carol Lea Spence  
Front Cover Photo: Matt Barton  
Back Cover Photo: Carol Lea Spence  
Additional Photo Credit: Gettyimages.com

Send comments and letters to:  
The Ag Magazine Editor  
Agricultural Communications Services  
131 Scovell Hall, University of Kentucky  
Lexington, Kentucky 40546-0064  
E-mail: [magazine@uky.edu](mailto:magazine@uky.edu)

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It starts with us



# Kentucky Spirits Research Institute: A Signature Kentucky Partnership

A collaborative research and workforce development effort between Kentucky’s flagship university and one of the state’s signature industries, the new Kentucky Spirits Research Institute will help ensure that Kentucky remains the innovation capital of the distilling industry, not merely the bourbon production capital.

The College of Agriculture, Food and Environment is leading the institute, which draws on expertise from all colleges across the University of Kentucky as well as other Kentucky universities.

“It is exciting to pair Kentucky’s land-grant college of agriculture with a signature Kentucky industry. In partnership with other UK colleges, we will provide a suite of services to the industry, ranging from a trained workforce to the latest technologies and the grains and white oak we grow from the land,” said CAFE Dean Nancy Cox.

All major beverage alcohol industries around the world have workforce development and university assistance.

“The idea behind the Kentucky Spirits Research Institute is to merge UK’s research and educational missions to support Kentucky’s economy, providing opportunities for growth to our distilleries, our farmers and foresters, and our entrepreneurs and innovators,” said Seth DeBolt, horticulture professor and director of UK’s Distillation, Wine and Brewing Studies certificate program. “It’s great that UK will now be offering a ‘one-stop shop’ for research, management tools, and an educated workforce for what is a thriving, historical Kentucky industry.”

DeBolt said that today the majority of relevant patent applications are being filed by companies headquartered outside Kentucky. His goal is to bring that back to the state.

UK is to commit \$1 million in technology transfer for Kentucky-based companies over the next 10 years.

“The Kentucky Spirits Research Institute is an exciting example of the power of integrating education and research across several colleges on campus towards a

common goal, with close links to economic development in the commonwealth,” said Lisa Cassis, UK vice president for research. “We look forward to new educational initiatives that contribute to the spirits workforce, research that augments the spirits industry, and partnering with relevant stakeholders across the commonwealth within the auspices of the Kentucky Spirits Research Institute.”

In addition to encompassing a broad range of research and academic disciplines at UK, the institute will also work closely with the Kentucky Distillers’ Association.

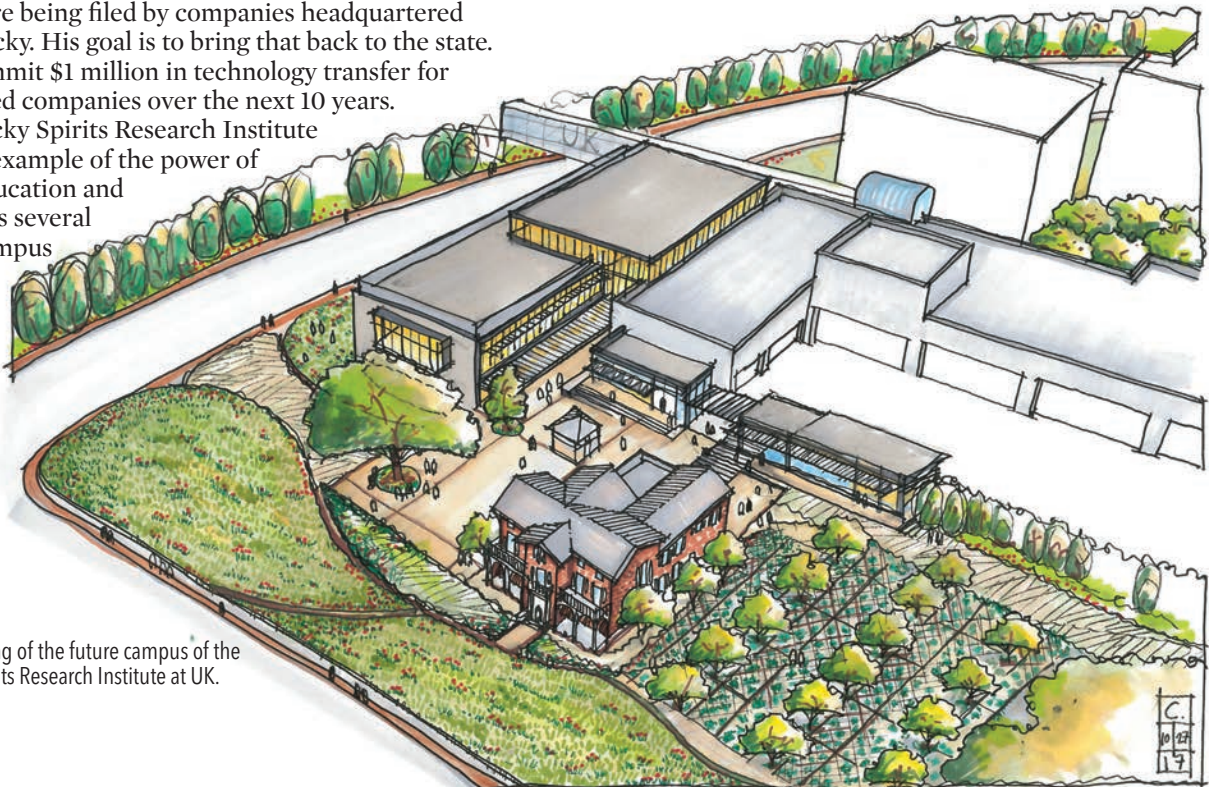
CAFE alumnus, Patrick Heist, ’00 MS, ’03 PhD, is the co-owner of Wilderness Trail Distillery and Ferm-Solutions, a research and technical service provider to the distilled spirits industry.

“It seems like a great opportunity for a productive collaborative effort,” he said. “This program has the potential to pipeline some really good talent into positions in the industry.”

UK is at the forefront of universities in alcohol awareness intervention. The institute will support that work and promote a safer drinking culture at UK and beyond.

For DeBolt and his institute collaborators, the Kentucky Spirits Research Institute’s success will be counted as having contributed to a vibrant Kentucky industry that is still thriving 100 years from now.

—Carol Lea Spence



Artist rendering of the future campus of the Kentucky Spirits Research Institute at UK.

# 4-H GIVES BACK



Ready, willing, and able describe the nearly 600 young Kentuckians who tackled various community service projects throughout Lexington and surrounding counties as part of 4-H Teen Conference this past summer.

4-H prides itself on developing young people into active, engaged leaders.

The community service project was

a new opportunity for the teens attending the leadership development conference to learn how to lead through service. The project was made possible by a grant from the Bluegrass Community Foundation and conference sponsor Farm Credit Mid-America.

“We were able to partner with organizations that educated 4-H’ers about their mission, so they could see the types of services that are provided in Lexington and get ideas to take home as well,” said Rachel Noble, extension specialist for 4-H youth development.

Partnering with more than 30 nonprofits in all, youth did such things as helping to mulch areas of the Kentucky Horse Park and picking up litter in Lexington neighborhoods.

Like many 4-H’ers, Debbie Myers, 2017-2018 state 4-H president and current CAFE student majoring in agricultural economics, does not plan to stop giving back anytime soon.

“This was a great opportunity for us to learn the importance of giving back,” she said. “It will help us develop into the leaders and citizens we need to be.”

—Katie Pratt



Owen County fifth-graders learn knife skills during the extension program Recipes for Life.

# Back to the Table

Families are returning to the dinner table due to an Owen County Cooperative Extension Service program.

Judith Hetterman, Owen County family and consumer sciences extension agent, began offering Recipes for Life in 2009 to teach students how to read recipes and cook. Funded by the Supplemental Nutrition Assistance Program–Education, the program has evolved, and fifth-graders now learn how to prepare and serve a five-course formal meal.

“This is one of the best programs that we have for our students,” said Julie Donahue, Owen County Public Library youth services librarian and extension volunteer.

When the students are not cooking, volunteers teach them about nutrition, manners and etiquette. Before the event, students submit a family recipe to be compiled in a book that each student receives.

Grayson Rogers, a fifth-grader at Maurice Bowling Middle School, said that while he cooks with his family, he realizes not everyone does.

“I think it’s good for kids to get a chance to learn about cooking,” he said. “Some kids eat out every night and do not know what is in their food.”

In the past year, extension agents in six other counties also hosted the Recipes for Life program, reaching nearly 900 students.

“After completing the program, 92 percent of students said they plan to prepare food at home, and 90 percent said they plan to try new foods,” said Lola Adedokun, senior evaluation specialist for the Kentucky Nutrition Education Program.

NEP will release it as a statewide curriculum in 2019.

—Katie Pratt



Kentucky 4-H'ers (l-r): Kayla Mohon, Raymond Carter, and Debbie Myers, pick up litter in a Lexington neighborhood as part of their community service project with Bluegrass Greensource.



SPOTLIGHT: MICHAEL GOODIN

Plant Pathology Professor Michael Goodin's office is crammed with the usual texts and papers, but also with a multitude of coffees and teas acquired during his frequent travels. On a tiny table sits his "coffee laboratory," where he invites visitors to taste test some of the finest coffees the planet produces. A conversation with Goodin is an enlightening experience, punctuated often with his joyful peals of laughter.

**Q:** You seem to embrace discovering different cultures.

**A:** I was born and raised in Jamaica. My mother is Canadian. My father did his undergraduate work at the University of Toronto, and my mother was a librarian. He was penniless, so he found it better to date the librarian than to pay his library fines. *(He laughs.)* In the early '80s, we moved to Canada. I did high school there and undergraduate work at Brock University with a double major in biology and chemistry.

**Q:** When did the agriculture bug bite?

**A:** My dad had a friend who I call Uncle Warren. Uncle Warren was a civil servant, but his real love was agriculture. His passion was papaya. These were like a foot long and weighed 5 lbs., not like these little things you see in the grocery. One day we get this call from Uncle Warren, and he's in tears. We drive to his farm, and he takes us to the papaya grove; the trees have no leaves, no fruit. He'd gotten papaya ring spot virus. That virus eliminated production in Jamaica of that classical, traditional papaya variety that had been growing forever. That sort of imprinted in my memory.

**Q:** Is that why you chose plant pathology as a career?

**A:** It's 1992, '93, I'm in grad school (at Penn State), and Dennis Gonsalves at Cornell University develops the transgenic papaya, a papaya resistant against the papaya ringspot virus. And I thought, "Suppose Uncle Warren had had these transgenics. He would have been able to sustain as a farmer." It doesn't require any chemicals. The plants are immune to the virus. The shelf life of the fruit is longer. It tastes the same. I was a naïve grad student, and I thought, "People are going

to love GMOs. Isn't this going to revolutionize agriculture!" *(His laugh rips through the room.)* I've been wrong about a couple of things in my life.

**Q:** It has revolutionized agriculture.

**A:** Yeah, but not in the way it should have. I think the conversation on GMOs has to change. This technology is too important to not use. We have, for decades, been able to engineer resistance to four major pests and pathogens of the potato, but we've never utilized that technology. Because we haven't, we've maintained one of the most chemically intensive crop systems in the United States.

**Q:** You once said, "Y'all need to eat each other's food!" To you, it seems food is about more than just filling your stomach.

**A:** It's the one thing that unifies us all. You want to learn about somebody? Go eat their food. Ever since we walked out of the Olduvai Gorge and spread around the world, it's been a search for food. Cultures are defined by their food systems. That's another reason to change, because the ultra-processed American diet is not a good one to have a conversation over. I think if you design the food system right, it lifts you up, it's positive, it's something that's a celebration.



Prime Berries with Plasticulture

Using a plasticulture system to grow strawberries on raised beds with black plastic mulch and drip tape, another grower has managed to extend his production season.

Shawn Wright, horticulture specialist at UK's Robinson Center for Appalachian Resource Sustainability, worked with Bob Craycraft of Craycraft's Greenhouse and Landscaping in Vanceburg, who was recruited for the project by Lewis County agriculture extension agent Philip Konopka. Craycraft, was looking for something profitable that would keep his crew employed earlier in the season.

"The advantage to the system is that the strawberries come on earlier in the season," said Wright. "He (Craycraft) wanted to check it out to see if it would increase his cash flow early in the season."

Wright provided the strawberry transplants using funding from the Kentucky Horticulture Council, while Konopka supplied the equipment and other resources. Craycraft put the transplants in the ground in the fall of 2017 and harvested the berries the following spring.

Wright said the cost to install the system runs between \$7,000 and \$10,000 an acre, and growers are hesitant to make that kind of investment. But the reward for the quality of the strawberries can be quite delicious.

"There are growers throughout the state that have been using the system for many years now, and it can be profitable," he said. Craycraft could not have been more pleased.

"The strawberries were just wonderful, and people went nuts over them," he said. "The one bad thing is, we ran out."

Craycraft has already put more transplants in the ground than he did last year. He said if he has another good year, he will add more transplants next fall too.



Planting strawberries using a plasticulture system

"These aren't the strawberries you are going to go out and buy 40 quarts to make some jam," Wright said. "These are nice, big, fresh strawberries that may be selling between \$4 and \$6 a quart, as opposed to \$2 a quart late in the season."

—Jeff Franklin

Hand in Hand for Health

Farmers and wellness programs are working together in a unique program that provides employees with cash vouchers that can be used to subscribe to community supported agriculture programs. The idea could potentially reduce employer health care costs and absenteeism rates.

The program began in 2015 as a coalition between the College of Agriculture, Food and Environment and UK Health and Wellness. Initially funded by a U.S. Department of Agriculture grant, 90 UK employees enrolled in one of four participating CSA programs. CAFE researchers' evaluation showed a definite increase in participants' daily average fruit and vegetable consumption as well as other healthy food and lifestyle choices.

"We find so few kinds of interventions that will really encourage such a broad base of change in diet, change in lifestyle, and change in focus on nutrition," said Tim Woods, UK agricultural economics professor. "Joining a CSA really seems to pull lots of the right levers."

Woods and assistant research professor Jairus Rossi have expanded the program to local governments and a few private businesses. The CAFE team has also joined with other wellness



and CSA coalition partners to extend this program nationally.

"It is an interesting confluence of health and wellness and sustainability of local food," Woods said. —Carol Lea Spence



# Campus Greening



(Above) Shacklette Elementary School, Louisville  
(Below) Board member Henry Heuser studies a design presented by Landscape Architecture students Erin Lockwood and Brittany Wetherill to the TreesLouisville board. Photos by Michael Hayman.

The landscape around several Jefferson County inner-city public schools is looking a whole lot better than it used to. That's thanks in part to students in a Landscape Architecture class in the UK College of Agriculture, Food and Environment. Chris Sass, assistant professor in the department, teaches Design with Plants, a 300-level course. He was approached by Louisville media personality and garden expert, Cindi Sullivan, about developing planting plans for school campuses in Jefferson County urban neighborhoods. Sullivan, a graduate of UK's College of Agriculture, Food and Environment's horticulture program, told Sass there was no tree canopy, students had no contact with nature and the overall environmental quality was low around the schools.

"Some of the schools lacked even basic playground equipment," said Sass. "It was sad to see, they didn't have much at all."

That was in 2015, and since then more than 100 trees have been planted. Landscape architecture students have done designs for roughly 15 schools. The nonprofit, Trees Louisville is involved, and area nurseries have donated trees. Local developers have also contributed through sponsorships.

"We did a couple of designs like a botanical garden at Shacklette Elementary," Sass said. "We used all kinds of native trees like oaks and maples. It actually made sense to the students that we could use trees to create space."



The UK students undertook the first plantings in Dec. 2015, and they have continued as money and donations have become available. When choosing the trees for their designs, they keep the type of soil in mind as well as how those trees can shape the space as they grow. So far, they have planted trees at about half of the schools. The class of about 12 to 15 students have to participate in the design, planting, and presentation for their grade.

"The students all enjoy the project, knowing it makes a difference," Sass said. "That satisfaction is what they enjoy the most."

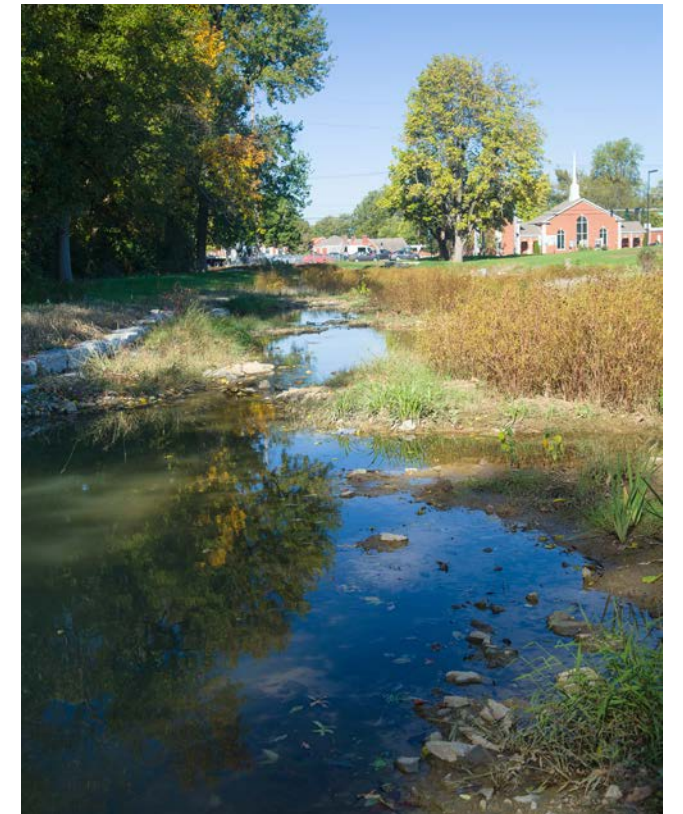
—Jeff Franklin

## Kentucky Master Naturalists

Kentucky Cooperative Extension joins 41 other states in offering the Master Naturalist program, an opportunity to advance education, research, and outreach efforts dedicated to the conservation and management of natural resources. A 40-hour course, the program provides participants with the foundation to be part of a community of well-informed citizen volunteers who will promote environmental stewardship.

Jefferson County Cooperative Extension offered a pilot program this fall. More counties will offer the 40-hour course in 2019. Carmen Agourdis, UK extension associate professor of biosystems engineering, taught a three-credit-hour course for UK students this fall as well. In addition to completing the course, participants must complete a capstone project and volunteer a minimum of 40 hours with a local organization focused on natural resource conservation and management. The cost is \$250, and upon successful completion of the course, participants will become a certified Kentucky Master Naturalist.

—Jeff Franklin



## Farm to Farm Table

It can't get much fresher than this. The college's Horticulture Research Farm added real meaning to "Farm to Table" by serving up food that never left the farm to begin with. This past growing season, the South Farm Dinner Series welcomed guests for a monthly dinner created with ingredients grown, prepared, and served on the farm by Honeywood chef Josh Smouse.

"This is an opportunity for us to reach people we wouldn't normally get to reach. And for them to get a leading local chef cooking food grown on this farm. I think it's a win-win," said Mark Williams, interim chair of the Department of Horticulture. "It's a partnership that shows how we're trying to give back to the community."

In September, the guests sampled South Farm-produced wines and feasted on onion and goat cheese tarts, eggplant, squash, potatoes and carrots, corn salad, and apple cobbler with whipped cream. To Smouse, it was an opportunity to teach people about the benefits of eating well. When asked what the guests were learning that night, he said, "To eat like a French person in the sunset with wine and vegetables and good company."

Now, that's a good lesson.

CAROL LARSEN



# Fighting Back from Extinction

By Carol Lea Spence

A squirrel with a hankering for adventure could travel from Maine to Mississippi in the canopy of chestnut trees and never touch the ground. Or so says one of the many legends surrounding the American chestnut tree. Perhaps it was true once, but it is no longer. Felled by the one-two punch of blight and root rot, the loss of the “redwood of the East” vividly illustrates how treasured parts of the natural world can be gone in a cosmic nanosecond.

Known as the “redwood of the East,” American chestnuts once thrived in the Appalachian Mountains. Photo from Forest History Society, Durham, North Carolina



Once the dominant tree in the hardwood forests of the eastern United States, rising to 100 feet and numbering in the billions, the tale of the American chestnut's tragic, swift decline and the human fight to bring it back from ecological extinction is one of science, volunteerism, and determination. To do something that has never been done before, to bring a species back from oblivion, is the result of research and teamwork by partners who want to restore the tree to its near-mythic glory. In Kentucky, the University of Kentucky Department of Forestry and Natural Resources partners with the Forest Health Research and Education Center. The center is, itself, a partnership of the U.S. Department of Agriculture's Forest Service Southern Research Station, UK, and the Kentucky Division of Forestry. They all collaborate with the nonprofit organization, The American Chestnut Foundation. Even the Catholic Church is involved, spreading blessings and education about the importance of stewardship.

The heart of the American chestnut's range is the Appalachian Mountains. In some areas, they composed 25 percent of the forest cover. On the ridgetops, they could be as much as 70 or 80 percent. Old timers reminisce about how the mountain peaks looked like they were covered in snow in June and July when the trees were in bloom. Known as the cradle-to-grave species, chestnuts were intrinsically wrapped into the area's culture. Cribs, homes, and coffins were built from its rot-resistant wood. It showed up in musical instruments. Its fruit fed both humans and wildlife and provided much-needed cash when locals would gather the nuts to sell during the Christmas season. Hogs, set out to roam free in the woods, would quite literally pig out on the sweet nuts, resulting in a sweeter meat come slaughter time.

Then the blight hit.

## A Tale of Two Pathogens

The fungus *Cryphonectria parasitica*, introduced from Asia and first noticed in New York City in 1904, swept through the range like wildfire. By the 1950s, the American chestnut was, for all intents and purposes, gone.

The fungus wraps itself around the trunk, cutting off the tree's circulatory system. Nutrients can't make it up, and carbohydrates can't make it down to the roots. The tree dies above the fungus line.

Chestnuts are prolific sprouters, so new sprouts will grow from the old root system. That may sound like good news, but the blight is still in the forest, waiting to pounce.

“We have stumps we think are 300 years old that are still pushing up these shoots, but they never make it to a mature tree,” said Christopher Barton, UK professor in Forestry and Natural Resources and president of Green Forests Work, a nonprofit organization that converts reclaimed mine sites into healthy forests.

The blight isn't the tree's only problem. Lying in the soil is another Asian fungus invader, *Phytophthora cinnamomi*, also known as ink stain disease. By inhibiting water uptake from the roots, this fungus kills the entire tree. There's no coming back from the dead if the *Phytophthora* root rot attacks.

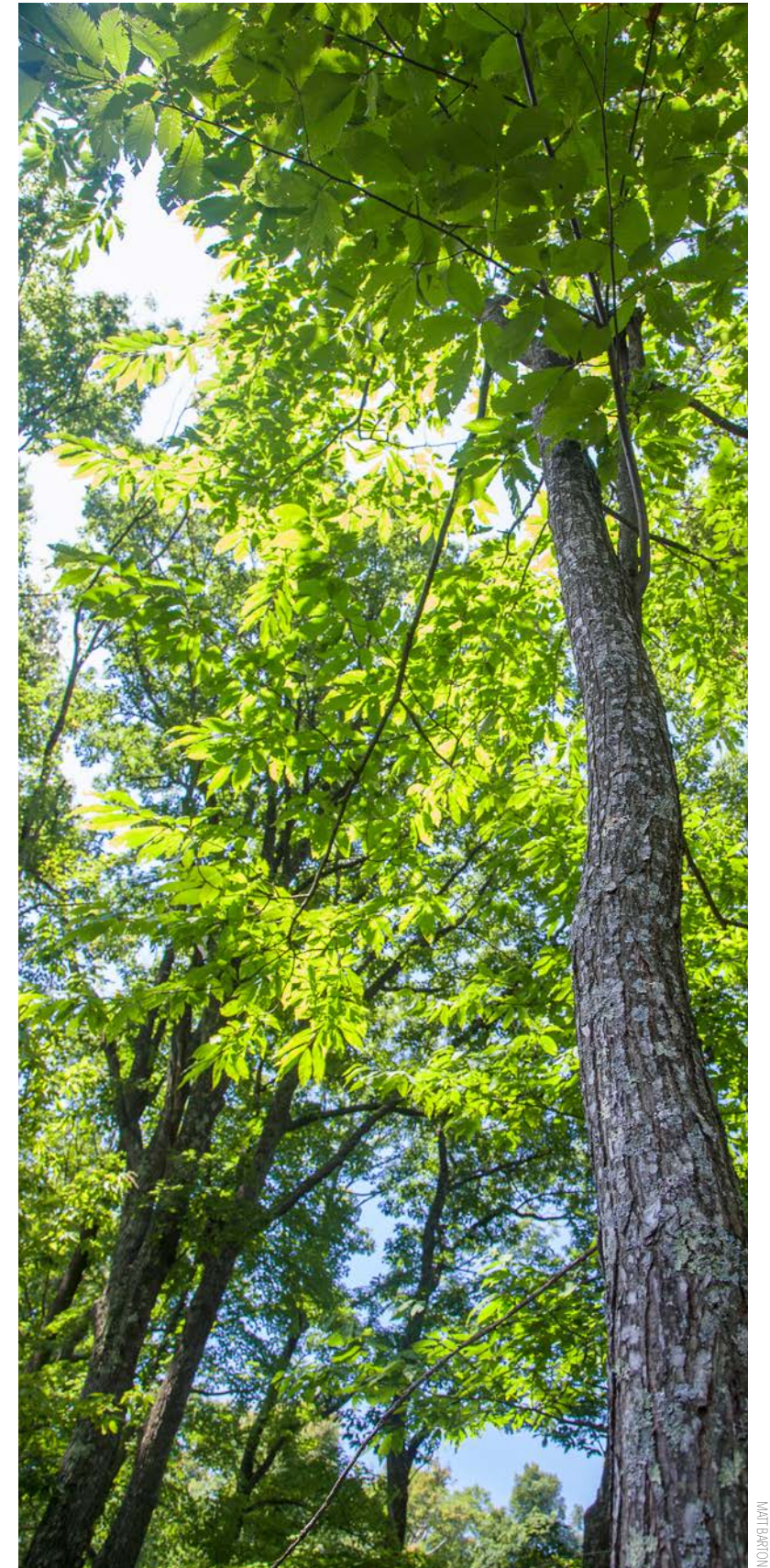
“We have the blight, which started in the North and moved south, and at the same time there were issues going on with root rot in chestnuts in the South. It was weakening those trees, and when the blight hit, it was like a double whammy,” Barton said. “We don't know if it was a combination of the two that made it so devastating, but certainly in our restoration efforts, ink stain disease is just as much of an issue as the blight, because it's prevalent in all of our forests, especially here in Kentucky.”

## Restoring a Forest Blessing

A song rose up from the group of people standing with Barton on the Paul Van Booven Wildlife Management Area in Powell County last summer. It was part of a blessing ceremony for four American chestnut seedlings led by Father John Rausch, a Catholic priest and environmental activist from Stanton.

“I'm just trying to help people open their eyes to the gift that this is,” he said.

This landscape, which once relinquished its forest for the black energy below, seems like a hostile environment to plant a tree, so a blessing might be in order. Covered with stilted shrubs, grasses, and a few hopeful saplings, a lonely



An American chestnut stands in the Berea Forest.



neglect seems to rise up from the old mining site. However, the range of the Appalachian coalfield and the American chestnut overlap almost perfectly, and Barton has plans to restore the area with chestnuts and other native species.

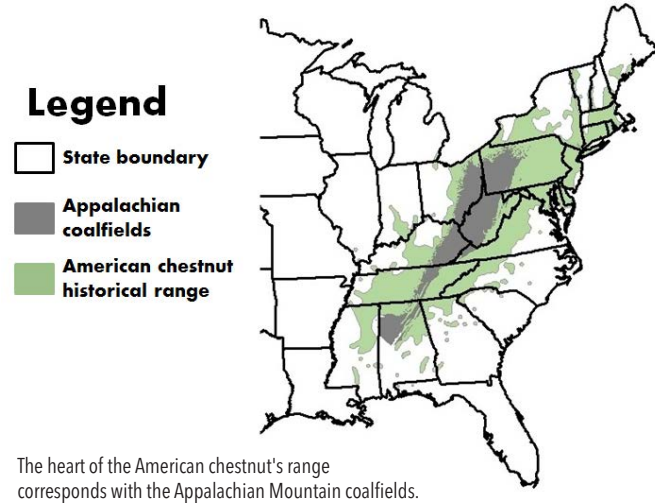
“The mine lands are actually a really good springboard for putting this species back in its natural range,” Barton said. “When you try to restore a species like this, you can't just go out to the forest and put some trees in the ground, because they're not going to have the right light conditions. These mine lands are sitting there usually in an open, grassland state.”

Knowing that the soil's fungus and bacteria were hauled away with mine debris or buried under tons of rock, Barton figured planting chestnuts on the mines would allow the trees to get established and grow resilient before the root rot fungus eventually re-invades these sites.

So far, Barton, fellow chestnut enthusiast Michael French, countless volunteers up and down the region, and The American Chestnut Foundation have planted more than 50,000 American chestnuts on old mine sites in Appalachia. Because there are so many of these big mine lands across the region, they're creating islands of seed they hope will eventually spread out to repopulate the entire range.

“We started what we called Operation Springboard through the Appalachian Regional Reforestation Initiative,” said French, director of operations of Green Forests Work.

ARRI is part of the Office of Surface Mining Reclamation and Enforcement in the U.S. Department of the Interior. Its mission is to find solutions to growing trees on compacted mine sites. ARRI works with environmental groups, state regulatory agencies, and researchers at a number of universities including UK. Together, they came up with the Forestry Reclamation Approach, which is basically a list of five steps for leaving the mine sites hospitable for reforestation. But there



CAFE alumnus Patrick Angel, from ARRI in the Office of Surface Mining Reclamation and Enforcement, stands with a 7-year-old American chestnut.

are still between 500,000 and 1 million acres on older reclaimed mine lands. There, trees fight a losing battle with the severe soil compaction that used to be the standard reclamation practice. That's why Green Forests Work was created in 2009. Green Forests Work is a nonprofit that closely works with UK—in fact, it is housed within the Department of Forestry and Natural Resources. To date, they have supported tree planting initiatives in 10 states, contracting with herbicide applicators to take care of the invasive species on the sites and bringing in large bulldozers to break up the soil compaction by cross-ripping the ground. And while these sites are planted with a variety of tree species, Operation Springboard made sure blight-resistant American chestnuts were part of the mix.

PHOTO PROVIDED BY MICHAEL FRENCH



Father John Rausch, in green, blesses American chestnut seedlings before they are planted.

## Back from the Dead

Trying to slow the losses, the USDA began a breeding program in the 1930s, crossing American chestnuts with their more blight-resistant Chinese cousins. The offspring received a half-level of disease resistance from the Chinese parent. But crossing that generation with another Chinese chestnut in the hopes of improving the resistance further, they ended up with more of the Chinese structure, a smaller, crooked tree that was not timber worthy.

The American Chestnut Foundation realized the USDA had the right idea with those early crosses, but they hadn't gone far enough. Charles Burnham, one of the organization's founders and a geneticist at the University of Minnesota, suggested the backcross method, which is what the foundation uses today. By backcrossing an American-Chinese chestnut hybrid with an American chestnut generation after generation, they eventually arrive at a tree that is 15/16 American chestnut. Among that group, those that show strong blight resistance are planted in the wild.

“There's still a lot of American chestnut out there, but they're basically sprouts, and most of the time, they get blighted and die back before they can produce seed,” explained Dana Nelson, research geneticist and director of the Forest Health Research and Education Center, based in the College of Agriculture, Food and Environment. “Occasionally they do, though, and that has provided the American Chestnut



American chestnut burrs. Photos provided by Christopher Barton

Foundation with trees they can use for breeding.”

Today, the American Chestnut Foundation is upping its efforts to capture genetic diversity across the whole range. To do this, they are using a smart phone app, TreeSnap, jointly developed by CAFE postdoctoral scholar Ellen Crocker and then doctoral student Bradford Condon and University of Tennessee postdoctoral associate Abdullah Almasaeed and assistant professor Meg Staton. The app, funded with a \$3 million grant from the National Science Foundation Plant Genome Research Program, is designed to connect scientists with foresters, landowners, and interested citizens in an effort to protect and restore native trees.

TreeSnap gives those who are out in the forest a way to collect tree data that researchers can access. It promises to be a big improvement in how organizations currently collect data.

Rex Mann, a retired U.S. Forest Service forester and member of the American Chestnut Foundation, said TreeSnap is “one of the greatest tools that's come along.”

“We are going to be working with landowners and doing two things,” he said. “Number one, actually digging up some of these sprouts (they've found). We've had good luck in moving a bunch of those sprouts; we got them to flower and pollinated them and included them in our breeding program. The other thing is opening up the canopy above some of the sprouts that are out there and getting them to flower in the wild, then collecting the nuts and planting them in conservation orchards we're going to be establishing all over the state.”

## Microscopic Answers to a Macroscopic Problem


Though much of the work to restore the American chestnut to its range rests with good, old-fashioned hybridization efforts, a map of the chestnut genome and genetic markers have proven invaluable tools to breeders. The Forest Health Research and Education Center, working with the University of Tennessee and Penn State University, has sequenced the Chinese chestnut genome, looking for the specific resistance genes.

“We have markers for those genes, so those markers can help in the breeding program,” Nelson said. “The genes also are of interest to scientists who do genetic engineering.”

The center is working closely with labs at the University of Georgia and the State University of New York on genetic engineering efforts.

“It's the science that drives us,” Mann said. “We're really looking to folks like the University of Kentucky and the Forest Health folks to help us find out some of the answers to bring the American chestnut back.” ■





*Season of mists and mellow fruitfulness,  
Close bosom-friend of the maturing sun*

—John Keats



# Allies in the Battle of the “Bulge”

By Aimee Nielson  
Photography by Matt Barton

Facing a daunting statistic of more than 40 percent of the population classified as obese, University of Kentucky Cooperative Extension and College of Public Health professionals took on the task over the past four years of building community coalitions to shrink the waistlines of nearly half their clientele.

Armed with hefty funding from the Centers for Disease Control and Prevention, Cooperative Extension family and consumer sciences agents and specialists from the UK College of Agriculture, Food and Environment have been fighting back hard. In Clinton, Elliott, Letcher, Lewis, Logan, and Martin counties, agents have strengthened or built new community coalitions to fight obesity and improve healthy eating habits and physical activity.

“It seems like a huge problem to solve, but when you collaborate with others and target specific things in a community, you can make positive changes,” said Janet Kurzynske, extension professor in the Department of Dietetics and Human Nutrition. “That’s what we have seen. Of the six counties we started with in 2014, five have reduced their obesity rate to the point where they no longer qualify for CDC funding.”

This is the first time the CDC has partnered with Cooperative Extension on such a project.

“This project has given the CDC a chance to learn a lot about us,” Kurzynske said. “The funding was an infusion of support that allowed us to grow a lot of the things we were already doing into long-lasting, sustainable programs and partnerships.”

## Coalition Strength

In Clinton County, FCS extension agent Christy Nuetzman already had a fairly strong community coalition in place, which allowed her to hit the ground running. She regularly meets with coalition members from all facets of county life including county government, public school officials, medical centers, the health department, managed care facilities, faith-based community representatives, and the public library.

“The CDC funding allowed our coalition to spearhead a variety of projects to make our community healthier and fit,” Nuetzman said. “We installed filtered water stations in schools, fit trails, and a disc golf course to make fitness fun. We were able to purchase playground equipment, update our parks, and establish educational programs to address food insecurity and healthy eating. All our coalition members made these things a reality through their vision and, in many cases, physical labor installing elements.”

Partnering with the UK College of Public Health gave a new energy and perspective for both colleges.

“Public Health has not historically worked closely with extension agents in these

communities,” said Kathryn Cardarelli, associate dean for the UK College of Public Health. “Through this project, I’ve learned how important extension agents are as key catalysts to effect change. Public health and extension is an important collaboration for these rural communities.”

In Clinton and most of the other counties, filtered hydration stations have been a big hit. Most counties have noticed an increased interest in and consumption of water. Tim Armstrong is the principal at Clinton County’s Albany Elementary School. He said the priority on hydration has already made a big difference for his students.

“We’ve noticed some positive changes by encouraging our students to stay hydrated,” he said. “They perform better on tests, they are able to think more clearly and stay focused, and it seems like we are rewiring their brains to

prefer water over sugary beverages.” healthier community.”

Armstrong also pointed out that the disc golf course added at the school has provided more than physical fitness opportunities.

“One of our teachers has even used the course as an outdoor science lab when teaching a lesson about energy,” he said. “So all of these things are strengthening our students’ minds and bodies.”

Charlotte Nasief, superintendent of Clinton County Schools, is a member of the coalition. Even though the funding for Clinton County is coming to an end, she believes the changes they have seen will continue.

“For many years, our county has been very close knit,” she said. “We all worked together to make each project successful, because we are all working for our kids and toward a

Martin County has faced an ongoing clean water crisis, so the hydration stations are especially popular there. But their community collaborators also renovated parks and playgrounds and offered samples of Kentucky Plate It Up recipes at the local IGA grocery store.

Agents in Lewis County also offered samples of recipes at their IGA in Tollesboro, but the store took it a step further.

“The store is partnering with us weekly now,” said Broderick. “They now try to incorporate a Plate It Up recipe each week for purchase in their deli and make the recipe cards available to the public.”

The Clinton County Extension Service used CDC funding to help purchase frisbee golf equipment for the elementary school in Clinton County.



Christy Nuetzman





# Walkable Communities

The funding enabled Cooperative Extension to invite national public health, planning, and transportation consultant Mark Fenton to visit participating counties.

Kurzynske said Fenton knows rural areas and how to work with them.

“Mark is very helpful in finding ways to make a community more walkable and identifying barriers to physical activity and safety,” she said. “He’s very insightful in creating ways to get people to come to your community and figure out ways to encourage them to walk around once they get there.”

Fenton toured each county with community partners to identify the strengths and weaknesses of each area, and he made recommendations about non-motorized transportation and how it can safely coexist with motorized transportation.

“Mark made some great recommendations for us,” said Gwenda Johnson, FCS agent in Elliott County. “He showed us places where we needed crosswalks to safely connect different entities. He gave us great ideas about multiuse

*“We are always working to help people learn to manage their time and increase their skills to make healthy changes at home.”*

—Janet Mullins, professor and interim chair of the UK Department of Dietetics and Human Nutrition

trails and areas where we need bike stands, so they’ll have a safe place to leave their bikes while they participate in other activities. We have an ambitious plan going forward, but it’s very doable with community collaboration.”

Implementing Fenton’s ideas has already made a difference in Lewis County. A bridge children use to walk to school was not safe enough.

“Fenton recommended that we make the shoulder wider on one side for our walkers,” said Amanda Broderick, FCS agent in Lewis County. “We were able to work with our county partners to do that. They also went a step further and added delineators (reflective posts) to make our walkers even safer.”

## Sustainable Outcomes and Future Vision

The former director of UK family and consumer sciences extension, Ann Vail, was inspirational in obtaining the funds and helping the CDC see the value of using the Cooperative Extension model to enact community change



Exercise and hydration were important parts of Clinton County's plan.

and collaboration. Kurzynske said her influence lives on through the commitment and further visioning of the agents and their community partners.

“This was a unique opportunity for the CDC and for the college,” said Vail, who is now the interim dean of the UK College of Social Work. “We did what we set out to do, and we have been able to see many positive changes. We fostered an environment and a cooperation that showed the CDC what extension can do when given the necessary resources.”

Janet Mullins, professor and interim chair of the UK Department of Dietetics and Human Nutrition is the evaluation specialist on the project. She said the goal across the board was to enact sustainable policy, system, and environmental changes.

“We know that extension offices are great at doing community-level work,” she said. “We’ve always been good at that. With this project, our goal was to make visible, environmental changes. We have improved facilities and educational opportunities, increased access to food retail and farmers markets—these are very visible changes.”

The true test of success is changing social norms, which Mullins said is long, hard work.

“We are always working to help people learn to manage their time and increase their skills to make healthy changes at home,” she said. “Visible changes in the community will help us make those changes (at home). Each county made appropriate and successful changes for their unique community.”

At the end of the project, five of the six counties have improved so much that obesity levels have dropped below 40 percent.

“Our plan for sustainability takes advantage of the way we do traditional programming,” Mullins. “Fenton led a workshop at UK to expand the cadre of people interested in conducting walking studies in their communities. It was attended by more than a dozen folks from a variety of disciplines, interests, and expertise. In 2019, our teams will join teams from Tennessee and host a joint academy to teach other agents what we learned, so they can spread it across both states.”

As part of the project, researchers developed an app for smart devices that will support physical activity and challenges and integrate with physical activity trackers. It will allow extension agents to create unique programs to get folks moving in their counties.

Jennifer Hunter, assistant director for family and consumer sciences extension said the project has been a great way to highlight what the college does best—taking the university to the people.

“This has just given us yet another opportunity to take research-based information and give it to the people of Kentucky,” she said. “Our subject matter is very nimble, and that gives us the unique opportunity to be proactive and reactive to the needs of our communities.” ■

The Clinton County Extension Office installed exercise stations on a trail near the local high school.





# Blue Water Farms

By Katie Pratt  
Photography by Stephen Patton

*“Our main mission is clean water and healthy soil. The intent of this project is to take the results and use them to improve our conservation practices.”*

—Reed Cripps, NRCS assistant state conservationist

A monitoring site sandwiched between the end of a soybean field and a rural Western Kentucky two-lane road is a perfect example of a successful research partnership. The site is part of a 10-year project led by Brad Lee, soil scientist in the UK Department of Plant and Soil Sciences. In the study, called Blue Water Farms, UK researchers conduct large, field-scale evaluations of best management practices in nutrient retention for the U.S. Department of Agriculture’s Natural Resources Conservation Service.

“We are excited to team up with agricultural producers, the Kentucky Soybean Promotion Board, Kentucky Geological Survey and the USDA in a partnership that provides us with an opportunity to evaluate these BMPs in a long-term, real-world setting,” Lee said.

Kentucky is one of 12 states participating in the national project. Each state is located in a watershed of a major waterway, such as the Mississippi River, Great Lakes, or Chesapeake Bay. Kentucky’s project centers on farmland located in the Lower Green River watershed. The Green River flows into the Ohio River and then into the Mississippi River. The watershed is also home to one of the largest agricultural production areas in the state.

## Connection Made

UK became involved in the project when Lee and Reed Cripps, NRCS assistant state conservationist for easements and partnerships, reconnected in Kentucky. They knew each other from previous jobs in Indiana, and Cripps was interested in starting an edge-of-field monitoring program in Kentucky, similar to the one he started while working for the NRCS in Arkansas.



(L to R) Glynn Beck, Mark Akland, and Dwayne Edwards at one of several data collection stations in Daviess County.

“NRCS provides support to farmers to improve their stewardship of their land,” Cripps said. “Our main mission is clean water and healthy soil. The intent of this project is to take the results and use them to improve our conservation practices.”

To get the project started, Lee needed additional collaborators with expertise in hydrology, site design, and various research specialties. He asked Dwayne Edwards, UK professor in Biosystems and Agricultural Engineering, and Erin Haramoto, UK weed scientist, to bring their research expertise to the project. Edwards works with hydrology, monitoring site selection,

Mark Akland measuring runoff during a rain event.







Mark Akland begins the process of water sample analysis.

and site design. As the research progresses, Haramoto will work with portions of the study that focus on best management practices involving weed control and cover crops.

“It is rare for researchers to be able to collect long-term samples like these from really large fields on commercial farms,” said Haramoto, an assistant professor in Plant and Soil Sciences. “It is a great opportunity for me to study weeds and cover crops on a large scale.”

## A Partnership That Works

Lee also asked Glynn Beck, a UK hydrologist in the Henderson office of the Kentucky Geological Survey, to collaborate on the project. The Kentucky Geological Survey is a UK research and public service institute. Beck’s location allows him to be intimately involved in the study, and as a result, he is the project’s field manager. In this role, he oversees installation of the monitoring sites, onsite sampling and contractor negotiation.

“I have a research interest in surface water and groundwater quality and use related to agricultural practices in Western Kentucky,” Beck said. “Blue Water Farms is an excellent way to be connected and collaborate with CAFE researchers and Western Kentucky farmers on water-related issues.”

Through a cooperative agreement between CAFE and the Kentucky Geological Survey, the survey’s Henderson office also houses UK scientist Mark Akland. A geologist, Akland is in charge of collecting samples from the monitoring sites when a significant runoff-generating rainfall event occurs. The samples will tell researchers whether the BMPs are keeping nutrients and soil on the farm, or if they are ending up in runoff. KGS also provides Akland with laboratory space to perform a scientific procedure that tells him how much sediment is in the sample. He also uses the space to prepare samples to send to Lexington for nitrogen and phosphorus analysis.

“A successful partnership starts with having someone who will cooperate with you,” Edwards said. “The CAFE/KGS partnership is a partnership that really works.”

*“Having UK researchers conduct their studies on local farms makes the extension service relevant to my clients.”*

—Clint Hardy  
Daviness County agriculture and natural resources extension agent

## Finding Farmers

Lee knew Kentucky farmers were interested in studying nutrient management retention related to cover crops and various poultry litter applications. He also knew the project fit nicely with the commitment of UK’s Grain and Forage Center of Excellence to give producers relevant and reliable data to help them use efficient and sustainable farming practices.

Producers have to meet a set of requirements before they can participate. Farms have to be located in the watershed, have the right topography and contain fields that are at least three to 15 acres. The land must be in a no-till, corn-soybean rotation. Producers had to commit to participate in a 10-year research study, which is much longer than typical research projects, with no financial gain from it.

To find willing farmers, Lee turned to his colleagues in the UK Cooperative Extension Service as well as those he already had worked with in previous studies and through commodity groups.

Clint Hardy, Daviness County agriculture and natural resources extension agent, connected Lee with Joe Thompson, whose land fit the criteria for the project. Thompson agreed to go through the lengthy application process, because he has worked on various projects with Hardy and trusted him. Thompson was the first Kentucky farmer approved for the study.

“Having UK researchers conduct their studies on local farms makes the extension service relevant to my clients,” Hardy said. “They appreciate and acknowledge that I’m in tune with the assets that they have and are excited to work with researchers to advance agriculture.”

## Financial Partners

The project is funded by NRCS, but it would not be possible without support from the Kentucky Soybean Promotion Board. The board has offered financial support annually since the study’s inception, believing it will produce relevant and useful data. The board also has a good working relationship with CAFE and its researchers; it regularly supports many research projects in the college.

“As farmers, we want good, unbiased information to help us produce a crop in the safest, most efficient way possible,” said Larry Thomas, secretary/treasurer of the Kentucky Soybean Promotion Board. “We feel like if there is an issue, we need to know about it, so we can work toward a solution. But at the same time, if there’s not an issue, we don’t want to accept blame for something that we are not causing.”

## The Next Chapter

UK researchers are gathering their first two years of baseline data from the monitoring sites on Thompson’s farm and will then study whether broadcast or direct injection of poultry litter retains the most nutrients in fields.

“I’m interested to see which practice retains the most nutrients,” Thompson said. “I’m particularly interested in the direct injection, because I have not used that application method on my farm.”

Monitoring sites should continue to pop up in the watershed as the project continues to progress. Another producer currently is going through the application process.

Results from this study could lead to a change in best management practices, which could eventually affect all producers and lead to more efficient and sustainable agricultural production. Research partnerships like this make agricultural innovations happen. ■



Glynn Beck adjusts a monitoring station in Daviness County.



# Passionate Partners in Agriculture’s Future

The University of Kentucky’s Grain and Forage Center of Excellence benefits greatly from the support of the state’s farmers and commodity groups.

“There has been some discussion about this center on an informal basis for almost a decade now, about how do we make this happen,” said Chad Lee, director of the center. Lee said those conversations took place between Logan County farmer Don Halcomb and Lloyd Murdock, UK extension soils professor emeritus.

“If you talk to Don, he credits Lloyd. If you talk to Lloyd, he credits Don,” Lee said.

The idea became a reality when the Kentucky Agricultural Development Board awarded the university \$15 million in July 2016, stipulating that the university raise an additional \$15 million in gifts, grants and donations within five years. To accommodate the center, the College of Agriculture, Food and Environment is renovating and expanding its Research and Education Center in Princeton. Construction is slated for completion in late summer or early fall 2019.

Inspiration and passion are words that best describe our partners in making the Grain and Forage Center of Excellence a reality.

## Firmon and Betty Cook

Despite a decline in the farm economy since 2014, Betty and the late Firmon Cook felt an obligation to UK for what it has meant to the family farm. The Cooks, with their son Milton, have been grain farmers in the Princeton-Cadiz area for many years raising corn, wheat, and soybeans. The couple are both UK graduates.

“The main reason we wanted to contribute was because the research center in Princeton has been an asset to our



farm over the years,” Milton Cook said, speaking for his father who recently passed away. “Dr. Lloyd Murdock, specifically, has helped diagnose issues, and there has been a relationship with the university for a long time. That is what motivated us to make a contribution.”

The Cooks gave \$100,000 toward the center’s general fund at the end of 2017.

“The western end of the state is where most of your row crop production occurs,” Milton Cook said. “It is only logical to be doing that research where it happens, and I think it will be beneficial for UK.”



## Howard Martin

Howard Martin’s gift was the first major gift received from an individual following the announcement by the Ag Development Board. The \$20,000 he contributed to the Lloyd Murdock Endowment will go for maintenance of the center.

The Todd County native didn’t attend college, but Martin was an inventor and entrepreneur. He developed an equipment attachment to clean the rows in no-till fields, where debris collects as a result of the fields not being plowed or turned. For three decades, his invention has been sold and marketed as the Martin-Till system. He credits Murdock for a lot of his success, because he helped Martin get a patent.



“He always gave me what I called a ‘reasoned answer’,” Martin said. “You could tell he had given it thought, and not just off the top of his head. He is very much a devoted teacher and professional.”

Murdock, who has known Martin since he arrived at Princeton in 1970, respected him for his intellect.

“I admired him, and he always had really good questions,” Murdock said.

## Rankin Powell

Rankin Powell spent more than 30 years as a UK agriculture and natural resources extension agent in two Western Kentucky counties. His first stint was in Livingston County for 11 years. Then he left extension for a few years to help on the family farm when his father’s health was failing. Powell returned to extension as the ag agent in Union County, where he spent another 20 years before retiring. He has donated \$25,000 to the Grain and Forage Center and then contributed a gift of grain worth \$51,000.

“I wanted to give back to UK to help generate unbiased research information for dissemination by ag extension agents,” said Powell. “UK is great place to work, and I enjoyed it tremendously.”



Powell believes the Grain and Forage Center of Excellence will be a big boost for the state’s farmers, especially those in Western Kentucky, where the majority of the commonwealth’s grain crop is produced.

“I think this center really is going to help us,” Powell said.

## William and Rene Payne

Bill Payne and his wife, Rene, gave \$154,000 to establish and endow the Payne Family Scholarship, which supports students who have an interest in forages. Growing up, Payne helped his father on their Lincoln County beef and dairy farm, and the two later formed a partnership.



He said UK was always a huge help to their farming operation, answering their questions and including them in research projects, which is why he wanted to give back to the college. Payne writes grazing management plans for the Natural Resources Conservation Service and serves on the Kentucky Forage and Grassland Council’s board of directors. The Grain and Forage Center for Excellence task force has also benefited from Payne’s expertise.

— Jeff Franklin



## HALF A CENTURY of Navigating Tax Waters

The University of Kentucky College of Agriculture, Food and Environment helps ensure that tax preparers are on top of their game through the Income Tax Seminars.

Held each fall throughout the state, these two-day seminars keep tax professionals up-to-date on the latest changes to federal and state tax laws and are held in partnership with the Internal Revenue Service and the Kentucky Department of Revenue.

“This program provides information to help tax practitioners navigate IRS systems and processes and their day-to-day duties,” said Susan Gainous, senior stakeholder liaison for the IRS, who has taught the seminars for years. “We appreciate that UK allows us to work with them on these seminars to elevate important issues that tax practitioners need to hear about.”

The UK Department of Agricultural Economics started the program more than 50 years ago with a focus on farm taxes. That component is still strong, with 33 percent of agricultural operation returns in the state being prepared by those the program has educated. The program has also greatly expanded its scope and now attracts financial planners, IRS Enrolled Agents, and attorneys—many are a nontraditional clientele for the college.

“For most of our participants, the UK Income Tax Seminars are the only connection they have with the college,” said Steve Isaacs, program director. “We have participants who have never been to an extension office, or called a county agent, but they come to the tax schools every year, because they value the information they receive here.”

Isaacs, along with the college’s Kathy Roe and Emily Brown, organizes the seminars that are offered in numerous locations around the state.

Bill Klump, a certified public accountant from Louisville, has been involved with the program for nearly three decades. His first eight years, he attended as a practitioner; since then he has taught.

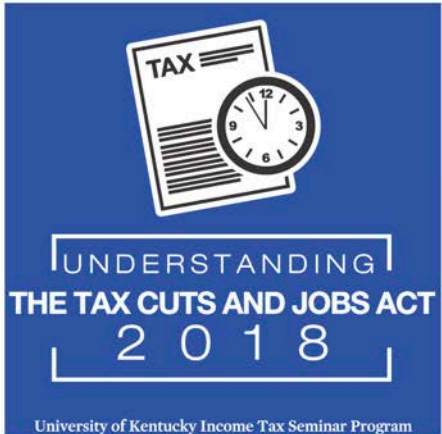
“I wanted to teach, because I felt like I could bring a different point of view to the seminars as a person who works in the field,” Klump said. “It is important for tax practitioners to learn from each other, because we need tax planning information and an opportunity to exchange ideas and tips to work more efficiently.”

The UK seminars are one of the only programs in the state to offer information on state tax code changes. Brian Stidham, resource analyst for the Kentucky Department of Revenue, has helped teach the section related to state tax laws for the past several years.

“I really enjoy it, because it gives us the opportunity to meet and interact with practitioners,” he said. “Plus, they get a contact with the state Department of Revenue

### 2018 Income Tax Seminars

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**University of Kentucky**  
College of Agriculture,  
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to answer any future questions that might arise, as they work with their clients.”

UK offers sessions that run through the fall and winter. For more information, visit the program’s website at <https://ukincometax.ca.uky.edu/>.

—Katie Pratt

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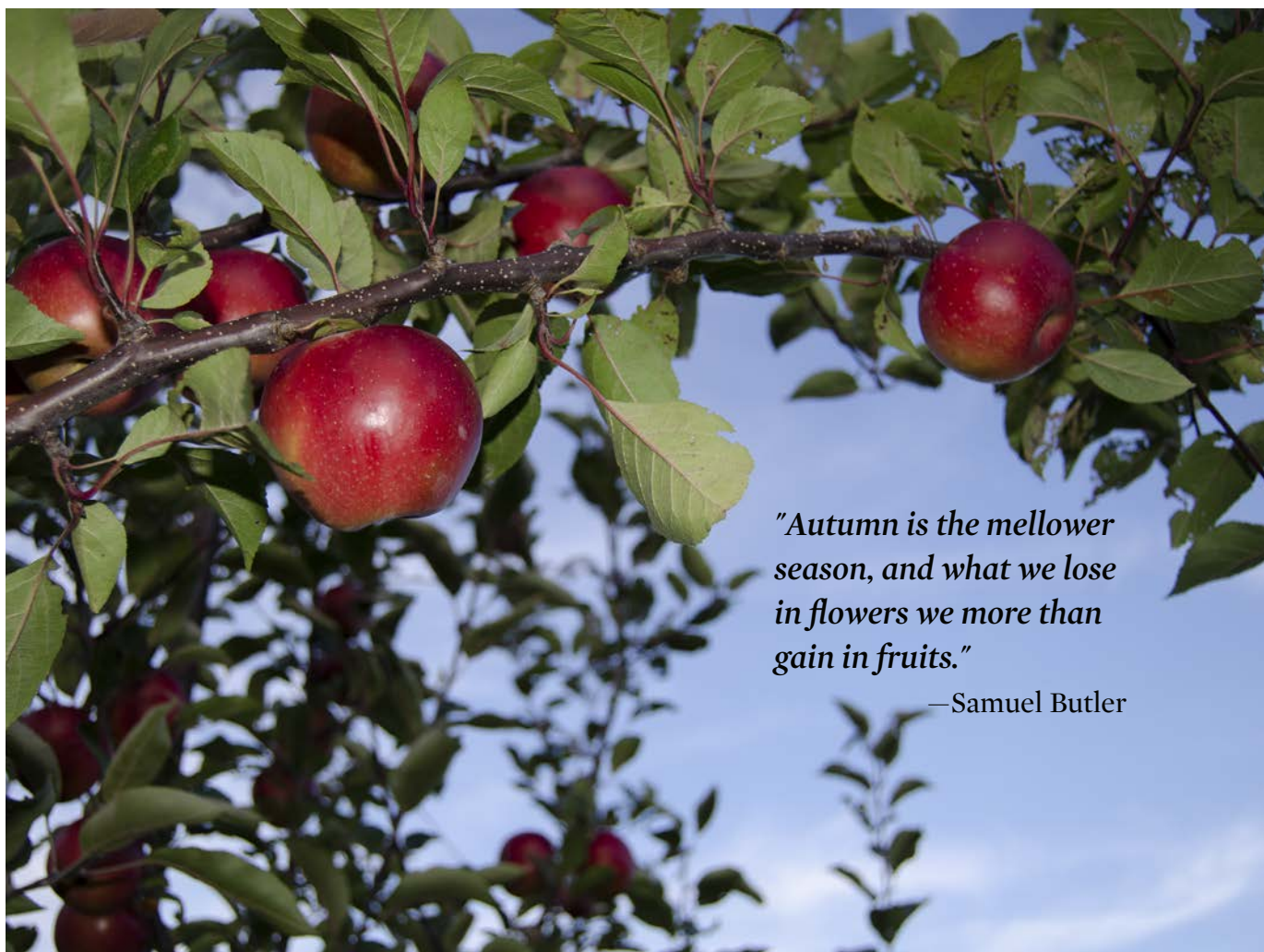
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*"Autumn is the mellower  
season, and what we lose  
in flowers we more than  
gain in fruits."*

—Samuel Butler

The apple crop flourishes at the UK Horticulture Research Farm.