

## CASH CROP

Greetings,

The N.C. Department of Agriculture and Consumer Services is pleased to partner with *BUSINESS NORTH CAROLINA* on its annual Cash Crop section. In the following pages you will find outstanding examples of businesses at the forefront of the agricultural revolution in North Carolina. They include profiles on public-private partnerships, research initiatives and startups that are finding new ways to build upon our state's agricultural heritage, know-how and natural resources to prepare for the demands of tomorrow.

The following pages are agriculture stories, but I think you will quickly notice that agriculture stories are also business stories. They are manufacturing stories and technology stories. Agriculture stories are transportation stories and health care stories. Agriculture touches every other sector of the state's economy, especially in our rural communities.

As you probably know, agriculture is the top industry in North Carolina. In fact, it makes up nearly \$85 billion of the state's \$500 billion economy. In addition, agriculture and agribusiness employ 16 percent of the state's workforce. More important, agriculture is a dynamic industry with world-class research programs and innovative businesses located from the mountains to the coast.

Without question, agriculture is a growth industry with tremendous potential. The United Nations estimates farmers globally will need to produce 70% to 100% more food by 2050 because of an increasing global population.

As commissioner of agriculture, I would like to see the state's agriculture industry grow to \$100 billion. I believe we can achieve this ambitious goal, but it will take continued innovation and perseverance from the agricultural sector and larger business community to make it happen.

The following profiles are just a sample of the diversity you'll find in North Carolina agriculture. I hope you enjoy learning more about the state's top industry.



N.C. DEPARTMENT OF AGRICULTURE AND CONSUMER SERVICES

*Commissioner Steve Troxler of the N.C. Department of Agriculture and Consumer Services.*

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N.C. Department of Agriculture  
and Consumer Services



ROGER W. WINSTEAD/N.C. STATE UNIVERSITY

*Students at N.C. State University study plant sciences in lab environments to create heartier and higher-yielding strains.*

# Better food through science

*N.C. agribusiness is expected to get a boost through two initiatives.*

**N**orth Carolina is banking on two new agribusiness initiatives that are poised to grow jobs, create new markets for farmers and bring a level of manufacturing to the state that hasn't been seen in decades.

The Plant Sciences Initiative, planned for construction on N.C. State University's Centennial Campus, and the Food Processing and Innovation Center, headquartered at the North Carolina Research Campus in Kannapolis, are primed and ready to feed North Carolina's economy to the tune of \$10 billion over the next two years.

"Our agribusiness industry sits at \$84 billion today, and I believe we can hit our goal of reaching \$100 billion by 2020," says N.C. Agriculture Commissioner Steve Troxler.

The Food Processing Innovation Center will be a big part of this effort, with the Plant Sciences Initiative working in tandem to develop advanced measures that will improve crop yields, introduce new plant varieties and reduce feed costs for farm animals.

"This is all about the future of agriculture and agribusiness in North Carolina," Troxler says. "We have great people and great farmers, and I have no doubt we can be a world leader in plant sciences."

Richard Linton, dean of N.C. State's College of Agriculture and Life Sciences, has embraced the challenge of leading university efforts in helping North Carolina by driving job creation and making agriculture the state's top economic sector. He's uniquely

qualified for the role. Linton, a nationally recognized food-safety authority, was a professor and chair of the Department of Food Science and Technology at Ohio State University before coming to North Carolina.

"I saw how to grow this sector in two pieces, through plant sciences and food manufacturing," he says. "North Carolina has a very diverse agriculture economy, with more than 70 commodity crops. It is the third most diverse state in the nation in plant varieties. We are also very diverse in soils and climates from the mountains to the Piedmont to the coast."

The state's environmental diversity is perfect for doing research by combining various soil types with climate variations to mimic other agriculture-rich areas across the country. This research will enable growers to develop new plant varieties and create better quality and better yield.

North Carolina also is unique in that N.C. State has 18 agricultural research stations around the state to take advantage of this diversity.

"No one else in the country has all of this," Linton says. "Add in [Research Triangle Park], UNC [Chapel Hill] and Duke University, all located 20 minutes apart — we should be a world leader in plant sciences."

Enter Stephen Briggs, entomologist, agricultural biotechnology business professional and commodity leader, who was most recently senior vice president of agronomy and corporate marketing at South



PROVIDED BY N.C. STATE UNIVERSITY

### *The North Carolina Research Campus in Kannapolis.*

Dakota Wheat Growers, a \$1.3 billion agriculture cooperative. Briggs signed on as the North Carolina Plant Sciences Initiative launch director last August to transform the state's big ideas into reality.

"I believe we can make this initiative into the Silicon Valley of plant sciences and solve the grand agricultural challenges for future generations in North Carolina," he says.

In 2014, the state commissioned an economic feasibility study to determine how a plant-sciences research initiative and a food-processing innovation center might create a manufacturing renaissance. By transforming underused manufacturing capacity due to the decline of the textile, furniture and tobacco industries, the state could become a force to strengthen a new industrial sector — "namely the value-added food manufacturing sector," the report stated.

These initiatives are predicted to bolster the state's economy to the tune of \$10 billion and 38,000 jobs. But they also could help on a grander scale by filling in nutritional gaps as the world's population increases while natural resources decline. The study pointed to a projection by the United Nations Department of Economic and Social Affairs that predicts the global population, at 7 billion in 2012, will grow to 9.6 billion by 2050. And while the demand for food continues to increase, tension is rising as food producers are experiencing greater competition for land, water and energy, according to the report.

"Basically, our big mission is to solve the grand challenge of agriculture and to say that in 30 to 35 years, we are going to have to double our food supply that we grow on this earth to feed the people," Briggs says.

Geoffrey Bock, project manager for the Plant Sciences Initiative, views the prospects as enormous. "The coalescence of the people who are behind this — from the university at the state level to the farmers across all 100 counties in North Carolina — the depth and breadth of this is unprecedented from anything I have seen in my career."

The university is preparing to break ground on the 185,000-square-foot building in 2019 and plans to open its doors in 2021. The building will be designed for multidisciplinary research and collaboration.

Research will not be limited to plants for human consumption. The Plant Sciences Initiative also will conduct research on crops for animal feed, forestry, turf and ornamental vegetation, Briggs says.

The building, which will cost \$160.2 million, is about 90% funded, according to Briggs. He predicts the building's output will be important and far-reaching.

"The cutting-edge research, the great ideas, the new spinoff companies this new research will create — it's not just about the building, which will be grand, but what is produced in the building, like solutions that will set it apart from all the other research facilities in the country," he says.

Across the state, on the North Carolina Research Campus in Kannapolis, Mario Ferruzzi is leading the charge in developing the Food Processing and Innovation Center, a state-of-the-art facility poised to revolutionize food processing and manufacturing in North Carolina.

The Food Processing and Innovation Center is a partnership among the N.C. Department of Agriculture, N.C. State University, the Economic Development Partnership of North Carolina and the North Carolina Research Campus.

Ferruzzi, who grew up in Carteret County, holds master's and doctorate degrees in food science and nutrition. Before

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PORT OF PROGRESS



returning to North Carolina in 2016, he spent 12 years as a professor and researcher at Purdue University in Indiana. He is recognized as an international expert in analytical chemistry and its applications in food and nutrition.

The program is on a fast track and is expected to open this fall.

The FPIC will focus on plant-based food, with the idea of spurring innova-

tion, while at the same time growing and supporting entrepreneurial efforts in the state related to developing new products and commercializing them, according to Ferruzzi.

Attracting food manufacturers to North Carolina is near the top of the state's wish list.

"In North Carolina, we are good at producing ingredients, but they have historically been sent elsewhere to be

manufactured into food. We know the value lies in the finished product and not the ingredients. We know traditional manufacturing in North Carolina has suffered, so we were tasked with adapting to food manufacturing and we believe it will be a good transition," Linton says.

"The pieces are already starting to fall into place," he adds. "The EDPNC is bringing industry to the table, the Department of Agriculture is handling the marketing piece, and N.C. State University has the research and development piece."

Christopher Chung, executive director of the North Carolina Economic Development Partnership, knows about the food agriculture industry. He worked in that industry in Columbus, Ohio.

"I thought if we could marry agriculture production with manufacturing, our state would be attractive to food-processing companies," he says. "North Carolina has attractive wages, tax rates and cost of living. The food industry is looking for ways to innovate, and we can help manufacturing drive more of that innovation. The Food Processing and Innovation Center is another arrow in our quiver."

Last year, the EDPNC created a food-manufacturing task force and hired Laura Lee to lead recruiting efforts. She is already putting projects in the pipeline, according to Chung.

"It won't happen overnight, but with dedication, we will keep doing what we need to do to keep the pipeline full, and we're hoping to be able to make some announcements this year," Chung says.

Troxler believes the state will start seeing results in a year or two.

"Companies are already taking notice, and we hope they will bring jobs to rural areas that are close to agribusiness centers," he says. "The Plant Sciences Initiative and the Food Processing and Innovation Center are unique. No other state will have anything like this." ■

— Teri Saylor is a freelance writer from Raleigh.

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## CASH CROP

# Where's the beef?

*Improved Nature cooks up meat's replacement in a world hungry for a solution.*

Every time a schoolkid peels open a Lunchable meal or a guy picks up a Slim Jim at his local convenience store, he or she is enjoying some of Rody Hawkins' best-known work.

So what's a meathead who grew up on a Tennessee cattle farm and holds a doctorate in meat science doing leading a team of scientists developing meat's plant-based replacement? "How else are we going to feed 9 to 10 billion people on planet Earth by the year 2050 unless we become more efficient in how we feed them?" Hawkins asks.

Garner-based Improved Nature LLC believes it has a solution to world hunger by binding plant proteins together to make products that look, taste and chew like meat. Developing the company's chicken-free strips, beef-free filets and pork-free cutlets are some of the same scientists who created some of the country's most famous meat products.

Hawkins was fresh out of college in 1986 and working at Oscar Mayer when he developed Lunchables, a ready-made meal designed for schoolchildren. He designed a tray and filled it with crackers, small slices of ham and turkey, cheese slices and a mint. Kraft Heinz Co. now makes 44 varieties of Lunchables.

"I didn't know it would be as big as it is, but I did tell them that they didn't have to pay me a salary, just give me 1% of the profits," Hawkins says. "They laughed. It took a while for Lunchables to be profitable, but it has done quite well"

Hawkins left Oscar Mayer for GoodMark Foods Inc. in 1988, arriving in Garner to work in the meat-snack industry. Hawkins believed GoodMark's Slim Jims was a good product with a small market. That changed when GoodMark started promoting Slim Jims as a manly snack through associations with bull riding, NASCAR, the X Games and professional wrestling. Omaha-based ConAgra Inc. bought GoodMark for \$225 million in 1999, and Hawkins stayed through 2002 before starting RDI Foods LLC, a consult-

ing firm. He gradually added some of his GoodMark colleagues including Larry Chandler, Steve Klawiter and Sarid Shefet.

Together, the partners solved complex problems for food manufacturers. When the Department of Defense needed a tasty food that was shelf stable for years, RDI developed a sandwich that can withstand 100-degree temperatures for six months without its texture, taste or appearance being affected. If a 3-year-old sandwich sounds appetizing, you can snack on one at many outdoor equipment stores, but you won't find Improved Nature's products on store shelves yet.

The Los Angeles Unified School District, the largest in the country, will test Improved Nature's products in its cafeterias this spring. Berkeley, Calif., schools are already offering them. The company considered starting a direct-order business but decided it would be a distraction from developing new products to meet a burgeoning world population with an increased appetite for a varied diet. Improved Nature's plan is to work with other



EAMON QUEENEY/NORTH STATE JOURNAL

*Rody Hawkins, a food-industry veteran, leads Improved Nature, which uses plant proteins to produce a meatlike food.*

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companies that will rehydrate, package and ship products to hungry customers.

A process that could bind a plant product into meatlike fibers had been developed but not implemented successfully before Improved Nature tackled the problem. Moshe Meidan, the Israeli inventor of the technology, knew RDI's Shefet. Meidan joined the team, and the focus shifted from consulting to developing this new product. Improved Nature was born. Today, it has one principal investor whom Hawkins declines to name.

Alison Rabschnuk is director of corporate engagement at the Good Food Institute. She has some of Improved Nature's "chicken" tenders in her freezer at home and says co-workers think they are very similar to the taste and texture of real chicken. She says the biggest challenges in global food technology are feeding more than 9 billion people worldwide by 2050 and alleviating climate change. "Plant-based [and clean] meats are the answer

to both of those questions," she says. "Improved Nature is one example of companies using innovative processes to make plant-based meat products that are vastly more sustainable than their animal meat counterparts. We know from research that many consumers are seeking out products that have a similar taste and texture to meat while also containing equivalent protein."

Hawkins spoke in September at the Concordia Annual Summit, a conference revolving around the United Nations General Assembly week in New York. In his remarks, Hawkins said the conversation has shifted from finding more efficient food production and transportation methods to finding more efficient and sustainable food sources. As Hawkins left the conference, a woman he didn't know came up to him and said, "I just want to give you a hug." ■

— Tim Stevens is a freelance writer from Raleigh.



PROVIDED BY IMPROVED NATURE

*Food made from plants that taste like meat is not limited to just snacks; it can be transformed into a dinner entree, as well.*



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# High on the hogs

**T**om Butler is a Harnett County farmer, environmentalist and, now, his own electric utility.

For most, electricity is a one-way street flowing from a conventional grid to consumers. Butler is both customer and producer, thanks to a resource he literally had sitting around.

“We had no idea of the environmental impact when we started growing hogs,” he says. “We went from 10 pigs to 8,000 pigs.” Thousands of hogs create about 6,000 tons of methane annually, a number multiplied by 23 years as a contract grower for Clinton-based Prestage Farms Inc. Butler stored waste in covered lagoons and gradually burned off the methane. Until the microgrid.

The idea of a microgrid isn't new — hospitals, for example, might have one as a source of backup electricity in a storm — but the idea of a microgrid for a neighborhood is new. What if, during the next hurricane, your home still had power despite broad outages? Normally, a microgrid is connected to a traditional grid but during outages, it can operate in “island” mode, generating and storing energy independently.

Butler Farms had most of the ingredients: Hog waste plus solar panels to generate energy. Thanks to a partnership with its local utility, Dunn-based South River Electric Membership Corp., and

Raleigh-based N.C. Electric Cooperatives, the farm also has a 180-kilowatt biogas generator. Soon, island mode at the Butler Farms microgrid can be expanded to “island feeder,” supplying power to nearby homes, about 28 to begin with.

The possibilities of peer-to-peer electricity stand to change the way we see utilities. For Butler, this first step means being a better neighbor, worth an investment he puts somewhere between \$700,000 and \$1 million since 2008. “The fact that we have a small hog farm with battery storage, diesel standby [power], a biogas generator and solar, to me, that's pretty amazing.” ■

— Allison Williams



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