

NC STATE

EXTENSION



OUR MISSION

NC State Extension serves as a bridge between North Carolinians and our state's preeminent research university.

Working with our valued partners, Extension serves all North Carolinians through lifelong skills and learning. We discover and implement better agricultural products and processes, educate and develop future leaders, and help families and individuals adopt healthier lifestyles.

Based in NC State's College of Agriculture and Life Sciences, NC State Extension provides non-formal education and research-based resources to enrich the lives of all North Carolinians and grow our state. NC State Extension also includes faculty and staff from NC State's College of Natural Resources.

Message from the Director

NC State Extension is putting research and knowledge to work to improve our state. Simply put, we grow North Carolina. That's our mission, and I'm proud of our people and their efforts over this past year.

While it's not always feasible to analyze the multi-faceted impacts of every customer interaction, we always strive to improve. So we tried something new this year.

In addition to our traditional reporting systems, we brought in a consultant, TEconomy Partners, to provide an independent analysis of Extension's collective reach and impact in 2018, while helping to identify needs and opportunities. I feel immensely proud to see the outcomes of our efforts more fully defined. Among the highlights, Extension...

- › Generated an economic impact of nearly \$2.1 billion for North Carolina through our collective efforts;
- › Directly supported more than 1,700 jobs for North Carolinians in every county; and
- › Created an additional estimated 10,469 agricultural jobs, based on projected yield increases related to our efforts with key crops.

Essential to the ongoing growth of N.C. communities and economies, is our collaboration with USDA's National Institute of Food and Agriculture, N.C. A&T State University and local governments across the state. Together our network of partnerships and technical expertise helps to create economic, societal and intellectual prosperity in every corner of the state.

Thank you for taking the time to discover more about our work in this report, which is also available at go.ncsu.edu/ExtensionImpacts. I look forward to working with you in the coming year, because when we Think and Do, we grow North Carolina.

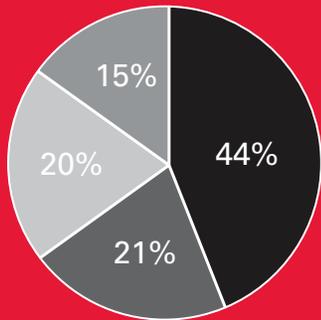


A. Richard Bonanno
Director, NC State Extension
Associate Dean, College of Agriculture and Life Sciences



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EXTENSION EXPENSES

State	\$43.9M
County	\$19.2M
*Other	\$20.5M
Federal	\$15.2M
TOTAL	\$98.8M

*Grants, contracts, donations, etc.

Promoting Progress through Partnerships



As a land-grant university, NC State serves the people of North Carolina not only through research and academics, but also Extension. It's what sets us apart from most universities.

NC State Extension works in cooperation with the U.S. Department of Agriculture's National Institute of Food and Agriculture (USDA-NIFA), N.C. A&T State University, and state and local governments. This strategic partnership is called **N.C. Cooperative Extension**.



National Focus on Local Issues

Through USDA-NIFA financial and programmatic support, Extension is better equipped to identify emerging issues, to find scientific and technological solutions, and to improve the well-being of citizens.

Land-Grants Lead the Way

The Morrill Acts of 1862 and 1890, respectively, established land-grant universities with the mission to teach, conduct research and deliver knowledge to the public. NC State and N.C. A&T State universities fulfill that mission in North Carolina.

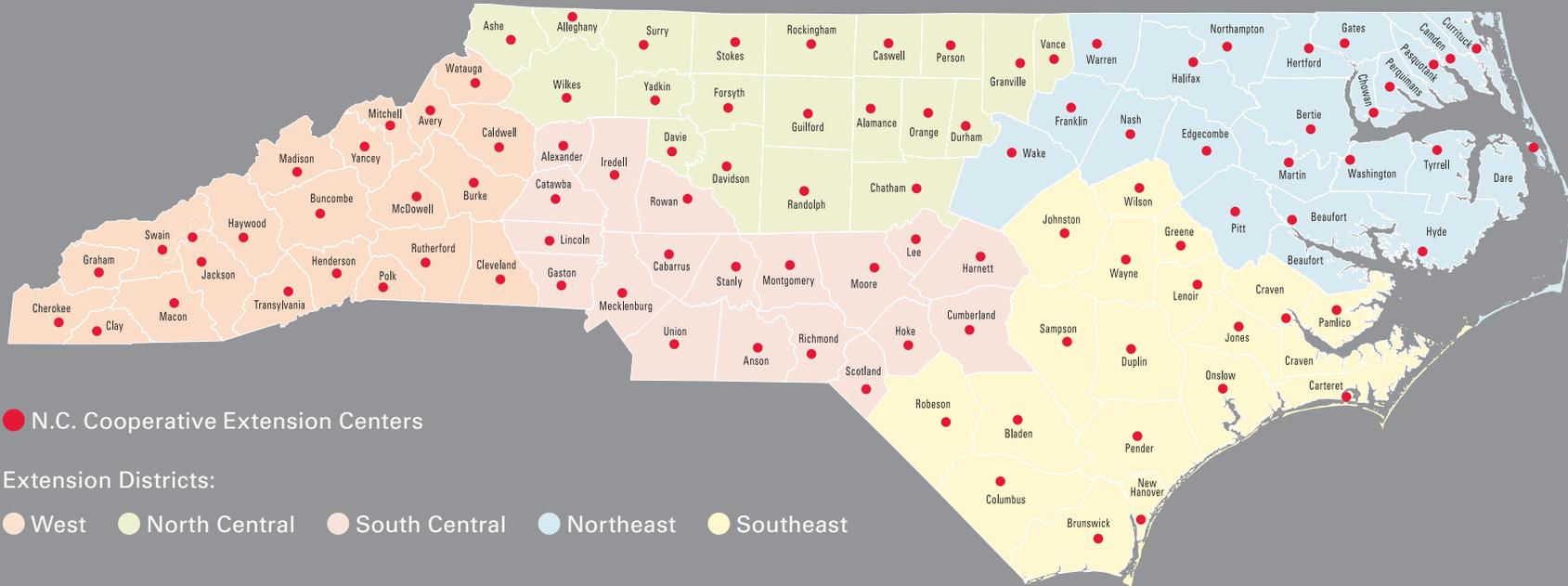
Serving All N.C. Citizens

Extension has offices in every county and the Eastern Band of Cherokee. Staff work with local government to support agriculture, horticulture, conservation, environment, nutrition and health, as well as consumer, youth and economic concerns.

Extension is Everywhere for North Carolina

101 Local Centers, 967 Professionals

NC State Extension offers locally-focused services in every North Carolina county and the Eastern Band of Cherokee. County centers house 599 NC State professionals, while another 368 faculty and staff on NC State's campus work with Extension in some capacity.



In 2018, we connected with
1,798,335
 people face-to-face via
 13,000+ programs*



\$2.1B
 Extension's annual
 economic impact on
 North Carolina



2.6M
 Unique Extension visits online
8.6M
 Total pageviews



27-1
ROI
 Economic return on
 government investments

* Directly engaged in the learning process individually or as part of a group.

Extension Drives Rural North Carolina's Economy

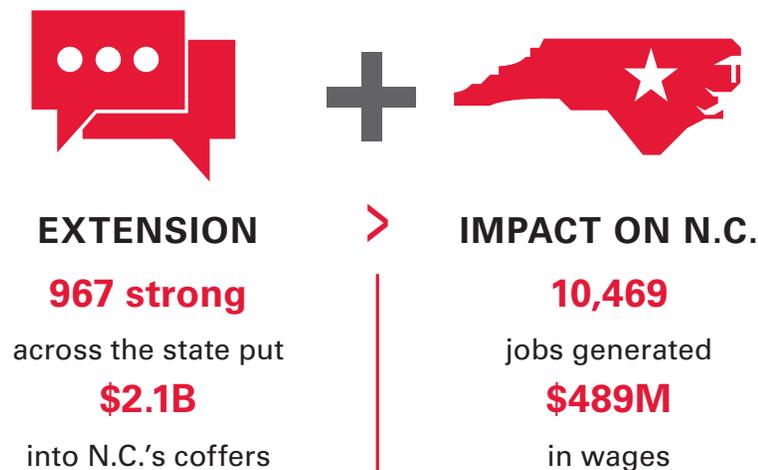
Vibrant main streets in North Carolina depend on a thriving agricultural economy. Extension's statewide network of centers and diverse partnerships uniquely position us to support North Carolina's rural communities, where the majority of our food and agricultural products are produced.

Extension creates opportunities and solutions that benefit rural N.C. through job creation, building sustainable agriculture and local food economies, helping farmers increase productivity and profits, and preparing our youth to become confident stewards of the future.. In 2018, rural areas actually saw the fastest job growth rate of any other geographical zones. A few of Extension's contributions included...

- > Provided educational services to over 1M North Carolinians in ^Tier 1 and 2 counties (our most economically-distressed and often rural regions)
- > Our community and economic development programs led to the creation, retention or expansion of more than 60 local businesses, while helping over 1,200 people in rural counties increase their knowledge or skill in business-related areas
- > 23,647 farms and agribusinesses in rural counties adopted Extension best management practices (from business management and marketing to pest control production), resulting in more than \$109M in total net income games.
- > 31,117 youth in our rural counties gained key career and employability skills through Extension's 4-H programs

Extension discovers, improves and implements solutions that grow rural North Carolina communities and economies.

^ The N.C. Department of Commerce assigns county tier designations based on economic development conditions, with Tier 1 representing the "most distressed" counties and Tier 3 the "least distressed."

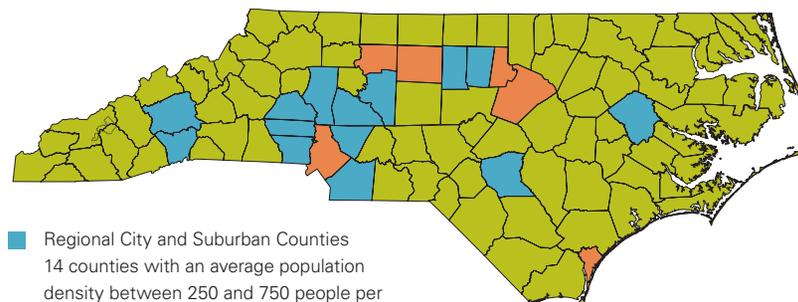


Meeting the Needs of Growing Urban Populations

The needs of urban areas are not always different from their rural neighbors, but the context in which Extension delivers services often varies greatly. North Carolina's six urban counties continued to grow in 2018 - roughly 35 percent of the state's population now resides in six of the state's 100 counties - with expectations of increased migration from rural areas in the future.

This presents new challenges for Extension, including finding ways to reach and support an urban customer base that is further removed from agriculture.

Extension has embraced an increased population size and density, greater diversity of citizens, and the complex organizational environment of N.C. urban centers where multiple partners often work toward similar goals. And Extension continues to adapt and develop programs and services to a vastly different physical environment in the city and suburbs.



- **Regional City and Suburban Counties**
14 counties with an average population density between 250 and 750 people per square mile.
- **Urban Counties**
6 counties with an average population density that exceeds 750 people per square mile.
- **Rural Counties**
80 counties with an average population density of 250 people or fewer per square mile.

Densities calculated by the Rural Center based on 2014 U.S. Census population estimates.

Extension in Urban Areas



AGRICULTURE

- > Increasing agricultural awareness and engagement
- > Tailoring gardening and food production services to urban environments
- > Strengthening local food systems
- > Promoting farmland and open space preservation



NATURAL RESOURCES

- > Promoting water conservation and protecting water quality
- > Improving waste management practice



HEALTH AND NUTRITION

- > Promoting health and decreasing the risk of chronic disease through nutrition education
- > Educating families about food safety, food preservation, nutrition, and physical activity
- > Certifying retail food managers in food safety practices



4-H YOUTH DEVELOPMENT

- > Teaching life skills
- > Developing future leaders
- > Strengthening STEM education opportunities
- > Preparing Latino youth for college
- > Focusing opioid prevention outreach on youth and their families



FAMILIES AND COMMUNITIES

- > Increasing food security
- > Promoting physical, mental, environmental, social and financial wellness
- > Building capacity of local non-profits
- > Leading local impact initiatives to address community issues

Translating Cutting-Edge Research into Practical Applications

NC State Extension helps grow North Carolina with programs and partnerships focused on agriculture, food and nutrition, and 4-H youth development. We operate as a two-way street, whereby local challenges and needs are brought to the university to be addressed through research, and Extension professionals apply that knowledge in everyday settings, from the farm to the kitchen to the classroom. Extension grows the economy, ensures food safety and production, protects public health, and creates opportunities for youth to grow and learn.



FEEDING OUR FUTURE

NC State Extension keeps North Carolina's agriculture industry – the state's leading economic sector – growing and sustainable by connecting growers with research-based information and technology.

200 county employees

590,300 face-to-face contacts

162,942 participants attended training program

31,159 farms adopted Extension best management practices

40,208 participants increased their knowledge of local food and agricultural systems



IMPROVING OUR HEALTH

Extension helps people make healthier decisions, reduce their risk of chronic disease and live better lives through programs from gardening and nutrition to local food systems and food safety.

102 county employees

287,282 face-to-face contacts

84,983 participants attended training programs

1,206 food service employees trained

32,225 North Carolinians increased their consumption of fresh fruits and vegetables



ENRICHING OUR YOUTH

Extension's 4-H program addresses the diverse issues and backgrounds of today's youth, helping to grow more than 225,000 youth into healthier, more involved citizens and future leaders.

113 county employees

399,902 face-to-face contacts

225,550 total 4-H'ers

12,284 youth attended 4-H camp

39,780 youth increased their knowledge of career and employability skills

Note: An additional 184 NC State county employees are affiliated with other/multiple program areas (not included in figures above), as well as another 174 county Extension employees that are funded entirely by county governments and/or N.C. A&T State University.

Protecting Our Shared Environment

Extension faculty and staff in the College of Natural Resources (CNR) are committed to solving natural resources challenges by helping communities, businesses and citizens to manage and sustain our shared natural environment. They add tremendous value to Extension through programmatic efforts in Forestry, Wood Products and Tourism.

Extension Forestry

- Generated \$34B in tax savings on active farm, forest and pasture lands enrolled in the Present Use Valuation Program
- Protected over 9,000 acres of wildlife habitat that support up to 49 colonies of the endangered red-cockaded woodpecker
- Provided support for proactive conservation, management and carbon sequestration actions on nearly 88 percent of the state's land

Wood Products Extension

- Created an estimated economic impact of \$6.4M via six workshops (300 participants) addressing lumber, upholstery furniture framing, landowner education and firewood processing
- Distributed moisture meters to all 101 local Extension centers in response to recent natural disasters and flood damage

Tourism Extension

- Conducted educational events for 31 federal managers, increasing their knowledge of climate adaptation planning and threats facing cultural resources
- Assisted rural communities with economic revitalization efforts
- Increased awareness of the role of agritourism as a development strategy in local food systems





Labor Intensive

From tromping through soybean fields to jumping ditches for soil-testing, being an Extension agriculture agent with NC State is always a physically demanding job. Eight months and two weeks into Andrea Gibbs' first pregnancy, she hasn't slowed down.

As the only Extension agriculture agent covering Hyde and Tyrrell counties, Gibbs spends long hours in her car, criss-crossing the combined **1,002 square miles**. Most of the growers in the area know her by name.

On paper, this is Gibbs' job description: "to provide unbiased, research-based information to farmers by serving as their connection to Extension specialists and by implementing on-farm research trials."

Or there's how Gibbs puts it,

"I'm here for the farmers."

That involves farm visits, in person, to any grower who asks. It means hours a week of phone calls and paperwork, shuffling through research results at her desk in the Hyde County Government Building, and many more hours in the car covering her territory. As the pesticide coordinator, she spends January and February holding meetings around the county to make sure farmers' credits are up-to-date.

"Farmers are my heroes," Gibbs says. "I don't know how they do it, when there's so much risk involved. They work so hard and have a lot of sleepless nights. They do a lot to feed all of us. I love getting to work with them."

Read more at go.ncsu.edu/LaborIntensive



Building a Stronger Agricultural Future

NC State Extension discovers and implements better agricultural products and practices, while providing growers and agribusinesses with the resources they need to continue producing high-quality, economically-significant crops and livestock.

N.C. Agriculture Industry

Agriculture is North Carolina's largest industry, generating **\$87B** annually while employing roughly **17 percent** of the state's workforce. Our's is the third most diverse agriculture economy in the country, with more than **80 commercial crops** and a large animal agriculture presence.

- > 686,000 jobs
- > 48,000 farms
- > 8.1M acres
- > #8 in farm income

Growing New Opportunities

NC State Extension specialists are coordinating industrial hemp research trials with six varieties to determine how, when and which varieties to plant. Industrial hemp is now grown on upwards of 5,500 acres by 375 licensees from across the state.

go.ncsu.edu/HempResearch

To support North Carolina's \$791M craft brewing industry, NC State Extension specialists are helping farmers identify optimal hop cultivars and growing areas,

while addressing key issues related to plant nutrition, disease and pest management.

go.ncsu.edu/NCStateHops

Consumers are looking for low-calorie sweeteners that come from natural sources like stevia. NC State is developing stevia varieties ideal for N.C. soils and climates, and with improved crop yields and taste, while Extension helps farmers reap the benefits and meet the growing demand of a thirsty food and beverage industry. go.ncsu.edu/NCStateStevia

Advancing Animal Agriculture

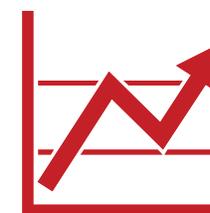
Animals account for 68 percent of North Carolina's farm cash receipts each year. North Carolina leads the nation in poultry and egg production, with more than \$4.5B in cash receipts, and ranks in the top three states for production of pork, turkeys and trout. Extension livestock specialists and agents work to improve farmer profitability, animal health and environmental sustainability.

NC State Extension Master GardenerSM

Thousands of talented volunteers work with Extension agents to deliver research-based information and guide homeowners in making environmentally sound decisions in their gardens, lawns and communities.

- > 3,236 volunteers contributed expertise and services statewide
- > 210,360 hours donated by volunteers
- > \$5.2M value of time and services provided by volunteers

Agricultural and economic statistics courtesy of the N.C. Department of Agriculture and Consumer Services



GROWTH
4 key crops
yielded nearly
\$1.6B

in economic benefits

We Grow Economies

NC State Research and Extension efforts with just four key crops - sweet potato, tobacco, peanut and blueberry - supported 13,075 jobs with wages totaling \$561M. Ninety-seven of the state's 100 counties produce one or more of these crops.



Fruits and Veggies: Just What the Doctor Ordered

What if eating fruits and vegetables wasn't just "doctor's orders," but an actual prescription? Early results from a small pilot program designed to test that question look promising.

NC State Extension Specialist Lindsey Haynes-Maslow – along with two other principal investigators from the universities of North Carolina at Chapel Hill and at Asheville – launched the program last year with two goals in mind: to improve patients' health and strengthen local agriculture.

After being referred by the UNC Family Medicine Center, low-income patients with at least one diet-related chronic disease, such as obesity, hypertension and diabetes, attended a six-week nutrition education class. Patients received free boxes of locally grown produce after each class, and they got "prescriptions" for produce boxes for an additional 17 weeks.

The 34 patients that completed the program said they ate more fruits and vegetables, increased the amount of water they drank and have a greater awareness of healthy food choices. They also reported worrying less about running out of food before they could buy more.

"Ideally, this study's pilot results could make a compelling case to health insurance providers to bring programs like this to more low-income individuals and local farmers across the state," said Dr. Haynes-Maslow, an assistant professor in NC State's Department of Agricultural and Human Sciences.

Read more at go.ncsu.edu/PrescriptionFruits



Better Health Through Food and Nutrition

In North Carolina, roughly 32 percent of adults are obese and 1-in-4 children live in poverty. The state also ranks 34th in the country for rural healthcare, meaning many rural communities lack access to adequate resources relating to healthy foods and lifestyles.

^A one-percent decrease in hospital inpatient visits in North Carolina (for diseases associated with poor diet and/or lack of exercise) would result in nearly \$24 million in cost savings to the state. Through education and outreach, NC State Extension provides research-based programs that promote a lifetime of good health.

287,282

Face-to-face contacts via our 2018 food and nutrition programs

19,013

North Carolinians increased their physical activity

EFNEP

The Expanded Food and Nutrition Education Program (EFNEP) is a federally-funded program conducted through Extension. EFNEP works to improve the health of limited-resource youth and families with children through practical education on nutrition, healthy lifestyles and food safety.

- > 45 counties provided EFNEP services to 2,728 families
- > 17,209 adults and youth participated in EFNEP
- > For every \$1 invested in EFNEP, there was \$10 in savings in healthcare costs

SNAP-Ed (Steps to Health)

The Supplemental Nutrition Assistance Program – Education (SNAP-Ed) assists limited-resource individuals and families nationwide. NC State’s SNAP-Ed project is Steps to Health, which promotes improved access to healthy food and lifestyles.

- > 150 sites made at least one community or organizational change to positively impact health, reaching 56,424 individuals
- > 10,629 people (9,281 children and 1,348 adults) participated in Steps to Health in North Carolina
- > 71,447 educational contacts were established within 61 counties

Food Safety

There are around 48 million cases of foodborne illness each year in the United States, many of which are preventable with proper food handling. Extension plays an integral role in providing consumers, growers and retail businesses with food safety education.

- > 1,857 growers trained in Good Agricultural Practices (GAP) through county center programs
- > 32,000 N.C. public high school students received foodborne illness education through our Safe Plates program
- > 196 school personnel members trained in HACCP (Hazards Analysis and Critical Control Points)

^ Based on analysis of state statistics from HCUP State Inpatient Databases [2014], recorded by the Agency for Healthcare Research and Quality (AHRQ), by TEconomy Partners.



Hands for Larger Service

Stephen Broadwell noticed a little white muzzle rising from Hurricane Florence's floodwaters – a newborn calf reaching for air. He had to act quickly. Stephen pulled the calf out of the flooded ditch, then took it by horseback to higher ground. There, his wife, Heather, and daughter, Sadie, took over the calf's care.

The rescue was one of the countless acts of service that Extension's 4-H'ers and their families carried out in the hurricane's wake. When and where they saw a need, they responded.

They participated, for example, in a statewide effort to collect and distribute donations of essential household items. They cooked and delivered meals for people who needed them, and through games and other fun activities, they helped children staying in shelters enjoy much needed laughter.

"Our 4-H'ers went above and beyond, and some of them continue to help with what will be a long period of recovery," said Mike Yoder, state 4-H leader with NC State Extension.

Orphaned by its storm-stressed mother, the bull calf that Stephen Broadwell rescued would need close attention over the weeks and months to follow. Ten year-old Sadie volunteered.

Months after the September storm, Sadie was still patiently bottle-feeding the calf twice a day. The farmer, so appreciative of what Sadie and her family had done to help, ended up giving her the calf.

Read more at go.ncsu.edu/CALS-Magazine



Growing the Leaders of Tomorrow

Extension’s 4-H program works with North Carolina’s youth “to make the best better.” In 2018, more than 225,000 kids participated in 4-H programming, which equips them with the confidence and knowledge to make a difference in the world. Through clubs and camps, 4-H encourages young people to reach their full potential as they learn by doing, addressing needs through their head, heart, health and hands (each “h” forms a leaf on the iconic clover).

- > 2,028 4-H clubs operated in North Carolina
- > 39,780 youth increased their knowledge of career/employability skills
- > 990 youth participated in the Juntos 4-H program, which helps prepare Latino youth (grades 8-12) to pursue higher education

4-H is a national leader in STEM education (Science, Technology, Engineering, Math)

- > 141,685 gain valuable knowledge in STEM fields

We help teachers deliver quality, research-driven STEM lessons to their students

- > 3,023 teachers used 4-H STEM curriculum in their classrooms last year

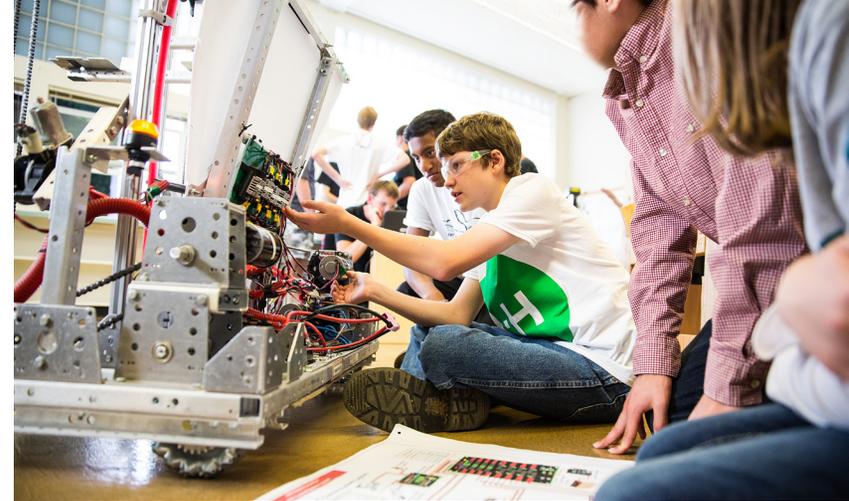
N.C. 4-H operates three camps: Betsy-Jeff Penn, Camp Millstone and Eastern 4-H Center

- > 12,284 youth attended 4-H residential and day camps

Cultivating Citizenship Through Camps

For more than 80 years, Extension’s 4-H camps have provided youth from Murphy to Manteo with valuable life lessons. 4-H camps strengthen the foundations of the diverse communities they serve and instill valuable, lifelong lessons in campers by promoting healthy lifestyles and fostering a sense of social responsibility.

Help sustain and grow these programs for future generations and ensure a healthy, fit and responsible North Carolina for years to come. Send a kid to camp at go.ncsu.edu/ExtensionGift





When Disaster Strikes, Extension Is There

From the State Emergency Operations Center to flood-ravaged neighborhoods and farms, when Hurricanes Florence and Michael took aim at North Carolina, Extension took action. Agents and specialists led disaster preparation and recovery efforts for countless communities, delivering animal feed and supplies to farmers, while providing constant support for North Carolinians.

Research-based solutions enhance recovery

Florence caused significant damage statewide - over \$1.1 billion in agricultural losses - but Extension has worked tirelessly to bolster recovery efforts. A few examples include:

- > Launching a newsletter to more than 1,300 stakeholders with timely specialist resources
- > Guiding farmers through crop evaluations, soil analysis and disaster aid programs
- > Assisting producers with animal evacuations and managing deceased livestock
- > Equipping homeowners with resources on food safety and cleaning their flood damaged homes
- > Extension's 4-H'ers also contributed to the cause with food and supply drives and even an animal rescue

Learning from the past, planning for the future

After Hurricane Floyd in 1999, Extension helped introduce new recommendations to mitigate flooding impacts on livestock and waste confinement operations. Nineteen years later, Florence resulted in the loss of 5,500 hogs (only a fraction of the total 9 million), and 98 percent of N.C. hog waste structures experienced minimal impact.

Extension's role in identifying issues and helping producers rebuild and adapt, long after a storm blows through, is critical to the long-term growth of N.C. agriculture. Learn more at go.ncsu.edu/DisasterCenter

Homegrown Educates, Connects North Carolinians

Homegrown, a new video series from NC State Extension, aims to reconnect people to the food, landscapes and agriculture of North Carolina. Homegrown shares trusted tips and tools from Extension experts across the state - everyday solutions for everyday lives - whether that means preparing a nutritious seasonal recipe, learning the best way to start your garden, or discovering where your food comes from. Dig in with us at go.ncsu.edu/Homegrown.

Providing Solutions Through Publications

NC State Extension publications provide practical guidance, backed by science, on a vast array of topics. Extension produced 43 numbered publications this past year, in addition to more than 300 factsheets developed independently by specialists. We distributed over 30,000 copies through print/digital sales, all of which are available at go.ncsu.edu/Extension-Publications.

Putting Knowledge to Work for North Carolina

NC State Extension offers 13,000 educational programs, 101 local centers and nearly 200 websites. Whether it's on the farm, in the city or on the web, we grow North Carolina.

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