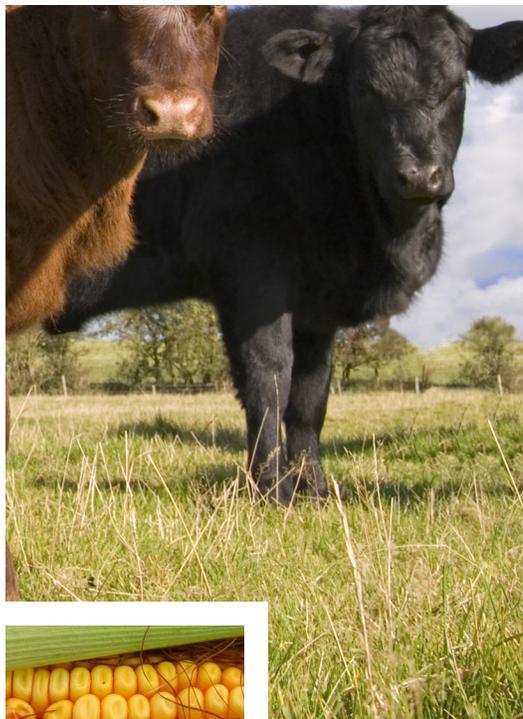




# RESEARCH STATIONS ANNUAL REPORT

2013



North Carolina  
Department of Agriculture  
& Consumer Services

North Carolina State University  
College of Agriculture  
& Life Sciences

NC A&T State University  
School of Agriculture  
& Environmental Sciences

## FEEDING THE WORLD BY 2050

World population is projected to reach 9 billion by the year 2050. In order to meet the demand of the world's burgeoning population, food production will have to at least double over the next 37 cropping seasons. Food security quickly becomes a national security issue when scarcity occurs. So, the challenge of feeding the world's growing population is critical to a healthy, prosperous, and stable state, country and world.



## AGRICULTURAL RESEARCH IS THE KEY

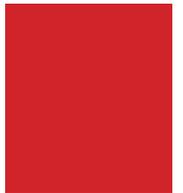
North Carolina Research Stations are on the front line of meeting this challenge. North Carolina is uniquely situated to be at the forefront of agricultural advances that will feed current and future generations. Our diversity makes us an extremely attractive place in which to push the bounds of agricultural productivity through research. World-class faculty at NC State and NC A&T lead the way as new technology, crop varieties, better utilization of available resources and improved efficiency are the focus of agricultural research on North Carolina's Research Stations.

In 2009, the Research Stations initiated a strategic planning process in which four main goals were identified as critical to meeting the mission. This report highlights and summarizes the progress during 2013 for each goal.

## The mission of the Research Stations

in North Carolina is "to manage crop and livestock facilities at research stations to support agricultural research, extension and teaching programs conducted by university faculty across the state." To that end, research stations provide the testing ground for innovation and discovery that undergirds the \$77 billion industry that is North Carolina agriculture and agribusiness. Moreover, this innovation and discovery makes national and international contributions to food production and food security.





## EXECUTIVE SUMMARY

2013 was a year in which Research Stations supported North Carolina's \$77 billion agriculture & agribusiness industry by providing the research platform for new and emerging technologies. It was also a year of improvement and innovation for the Research Stations. Some highlights include:

**New Equipment Upgrades:** Using its legislative appropriation of \$2.5 million, 52 new pieces of equipment (tractors, planters, irrigation, etc.) were acquired to begin replacing an outdated and expensive-to-maintain fleet. By leveraging trade-ins of existing equipment, over \$3.27 million worth of new research equipment was purchased or ordered.

**Beef Research Reorganization:** Utilizing existing resources and taking advantage of North Carolina's geographical diversity, a plan was put in motion to enhance and revitalize the beef cattle research capability across the State.

**NC Bioenergy Research Initiative:** The General Assembly has tasked the Research Stations Division to support the bioenergy industry in NC. Staff has been hired to oversee the program, provide technical support for research and manage a competitive grant program.

**Partnerships:** Strategic partnerships among NCDA&CS, NC State, NC A&T, USDA-ARS, and state commodity groups continue to be strengthened and enhanced, resulting in upgrades to the Research Stations and greater improvements in overall research capability.



## Our Goals

**Goal 1: Enhance Infrastructure for High-Quality Applied Agricultural Research**

**Goal 2: Ensure Efficient Research Station and Farm Management**

**Goal 3: Enhance Working Relationships and Communication**

**Goal 4: Strengthen Outreach, Extension and Education**

## GOAL 1: ENHANCE INFRASTRUCTURE FOR HIGH-QUALITY APPLIED AGRICULTURAL RESEARCH

- **New Equipment for Research Stations:** In 2013, the General Assembly continued its investment in agricultural research in North Carolina. It was recognized that the research stations across the state had an aging fleet of equipment and needed to be outfitted with the most modern equipment possible for high quality, precise and relevant research. An appropriation of \$5 million was made to upgrade equipment over the next two fiscal years.

As of the end of 2013, the research stations have acquired 52 new pieces of equipment, including 31 new tractors and various sprayers, planters, irrigation systems, etc. By leveraging the trade-in value of existing equipment, the \$2.5 million appropriation was stretched as far as possible. The total value of the new equipment ordered in 2013 was \$3.27 million.

- **Precision Ag Investment:** A heavy investment in GPS-based, precision agriculture technology was continued on the research stations in 2013. Building on existing equipment, more technology has been deployed on the stations resulting in greater precision, improved efficiency and more relevant research to support the modern agricultural industry.

- **Enhancement of the Beef Cattle Research Resources in North Carolina:** North Carolina's beef cattle enterprises contributed more than \$334 million in cash receipts in 2012. Across the state, six research stations are involved in beef cattle research with cow-calf herds. However, beef cattle research could be enhanced if these resources were combined, leveraged, and treated as a single, state-wide beef research herd.

A plan was made and put in motion to 1) build a statewide beef research herd with a common genetic background to remove variability in research, and 2) move cattle within this new system such that individual stations could serve as specialty areas for certain types of research. In this manner,

larger numbers of animals could be utilized for research and efficiencies could be gained by taking advantage of the unique climates and resources existing. The national competitiveness of North Carolina beef researchers is greatly enhanced because of increased study size, helping researchers leverage grant funding.



By utilizing the historic, registered Angus herd at the Upper Piedmont Research Station, and embryo transfer technology, a herd of 650-700 research cattle are being developed across North Carolina. At some stations, an expansion of grazing land is underway as well as improvements to facilities to accommodate this exceptional beef research herd in North Carolina.

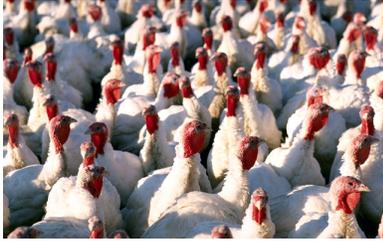
The enhancement and reorganization of the beef cattle research resources has gained some national attention from research and breed organizations and is revitalizing beef research in North Carolina. This effort is positioning our state to be a regional and national leader in beef research.

- **Training programs:** While investing in equipment is important, our people are our greatest resource. Staff from all 18 research stations have taken part in professional development opportunities and will continue to do so. In 2013, four research station superintendents presented at national meetings. Many also serve on local and statewide boards. Research stations will continue to invest in its people so that we can be recognized as leaders in the development and use of newer and greater technology.

- **Forestry Program:** The forest management program generated over \$400,000 during the year from timber and pine straw harvesting. With approval of the General Assembly, a portion of the funds generated supported the following projects: \$200,000 – Greenhouse Expansion (Tidewater); \$150,000 – Calf Barn Construction (Piedmont); \$150,000 – Forest Road Construction (Tidewater)

- **North Carolina Bioenergy Research Initiative:** The 2013 General Assembly appropriated funds to the Research Stations for the purpose of supporting the developing bioenergy industry in North Carolina. In early 2014, the division will begin its first cycle of awarding research grants targeted specifically to develop the knowledge base and infrastructure for producing feedstocks from crops and forest products for the production of cellulosic ethanol. A second grants cycle is expected in the second half of 2014. Staff have been hired to oversee this program and provide technical support for research in bioenergy crops. Additionally, Research Stations have assumed the administration of 17 grant-funded research projects formally managed by the Biofuels Center of North Carolina. These existing and new projects are expected to provide the knowledge base needed to grow the biofuels industry in North Carolina.





## GOAL 2: ENSURE EFFICIENT RESEARCH STATION AND FARM MANAGEMENT

*Research is conducted on over 80 commodities produced in North Carolina.*

**We are one of the most diverse agricultural states in the nation. The industry is supported by the research being conducted at our 18 research stations.**



### By the Numbers:

Research faculty at NC State, NC A&T, and USDA working on NC Research Stations	<b>130</b>
Research projects conducted across the system	<b>490</b>
Graduate students working on and receiving training on the research stations	<b>153</b>
Acres devoted to small-plot research (not including land for forages)	<b>1,308</b>

**Regional Management:** A pilot program for regional management, with the goal of sharing resources and working collaboratively to achieve research objectives, was initiated in 2013 to include the Sandhills Research Station (Jackson Springs), Piedmont Research Station (Salisbury), Upper Piedmont Research Station (Reidsville) and Upper Mountain Research Station (Laurel Springs). Staff met weekly by conference call and coordinated activities so that efficiencies could be gained to meet research objectives.

The program was a success. All four of those stations conduct research in crops that require high levels of hand-labor to establish, maintain and collect data at certain times of the year. By coordinating resources, research objectives in high-value, labor-intensive crops such as blackberries, grapes, tree fruits and vegetable

crops were accomplished faster. Staff members were able to take advantage of the differences in growing seasons and bring to bear combined resources in a timely manner. By moving a large percentage of the cattle at Upper Piedmont to Upper Mountain for spring and summer grazing, pastures at Upper Piedmont were able to be managed better, resulting in less reliance on feeding hay in the winter months at Upper Piedmont.

The concept of regionally managing our stations will be expanded in 2014. By taking advantage of all of our resources and managing wisely, the research stations will become more efficient and have greater research capacity than ever before.



## GOAL 3: ENHANCE WORKING RELATIONSHIPS AND COMMUNICATION

In recent years, NC A&T and NC State have been forging a closer partnership, in accordance with directives coming from the National Institute of Food and Agriculture (NIFA) for land-grant universities within the same states to collaborate on research and Cooperative Extension projects.

As a result, eight combined research initiatives from the NC A&T-NC State Research Partnership were developed in 2012. In July of 2013 a combined NC A&T/NC State Research Collaboration Meeting was held. Working groups around these initiatives were formed and members from both NC A&T and NC State began exploring opportunities and barriers to producing positive impacts in those areas.

<b>Relationship with NC State Administration</b>	Administration at NCDA&CS and NCSU meet at least monthly to facilitate effective management and strategic decision-making.
<b>Advisory Groups</b>	Faculty Advisory Committees were formed for each Research Station in 2013. The role of the advisory committees is to further enhance communication between research faculty and research stations as it relates to strategic planning and utilization of resources and facilities to ensure the research needs of faculty are being met.
<b>Partnerships</b>	Strategic partnerships between NCDA&CS, NCSU, NC A&T, USDA-ARS and commodity groups resulted in station upgrades, improvements and increased research capability.
<b>Center for Environmental Farming Systems (CEFS)</b>	The Cherry Research Farm continues to be a springboard for statewide initiatives such as the 10% Campaign, aimed at increasing consumption of NC products.
<b>Multi-State Projects</b>	<p>Research stations host a number of multi-state projects such as the SUNGrains breeding initiative for wheat, oats and barley as well as integrated pest management programs.</p> <p>In 2013, the North Carolina Research Station superintendents hosted their counterparts at Virginia Tech for their annual meeting. This is the first step in building collaborative partnerships with Virginia Tech research stations to build relationships, share technology and encourage multi-state research projects.</p>



## GOAL 4: STRENGTHEN OUTREACH, EXTENSION AND EDUCATION

### Field Days

- Research Stations hosted field days focused on cotton, peanuts, tobacco, reduced tillage, small fruits, tree fruits, hay and many other commodities.
- Visitors to the research stations in 2013 were able to ride in newly purchased trams as they learned about agricultural research ongoing at the stations. Seven new trams, specially designed for field days, were purchased in 2013. The trams conform to all safety standards and ensure a comfortable, safe experience for visitors to our research stations. In addition, they are able to be easily towed between stations for use where needed and when needed for citizens of the state to participate in events on the research stations.
- Partnerships with Cooperative Extension and the Research Stations were strengthened in 2013. Multiple training events were held for Extension at research stations. At the Piedmont Research Station, working teams centered around commodities were established to include Extension Agents and research station staff. These working groups plan field days, trainings and outreach activities collaboratively, and are realizing synergy from combining efforts to serve North Carolina farmers.



### Ag and Science Teachers

- Rowan County High School ag teachers have students participating in applied research programs at Piedmont Research Station focused on strawberry production with Dr. Jeremy Pattison of NCSU.
- Central Crops Research Station is working with a teacher and student from Clayton High School to collect 14 soil monoliths which will be preserved and utilized for future soils classes.
- The Northeast Regional School of Biotechnology and Agrisciences is in its second year in the Vernon James Center located at the Tidewater Research Station in Plymouth. The school currently has 60 students who have the opportunity to interact with researchers in addition to their traditional coursework.





Mountain Horticultural Crops Research Station. Photo by Marc Hall.



Piedmont Research Station. Photo by Marc Hall.

**In 2013 there were 100 events attended by ~8,000 individuals**

Event Type	No. of Events	No. of Participants
Field Days	10	970
Workshops/Training	33	948
Education	18	4,071
Tour	25	942
Other*	14	970

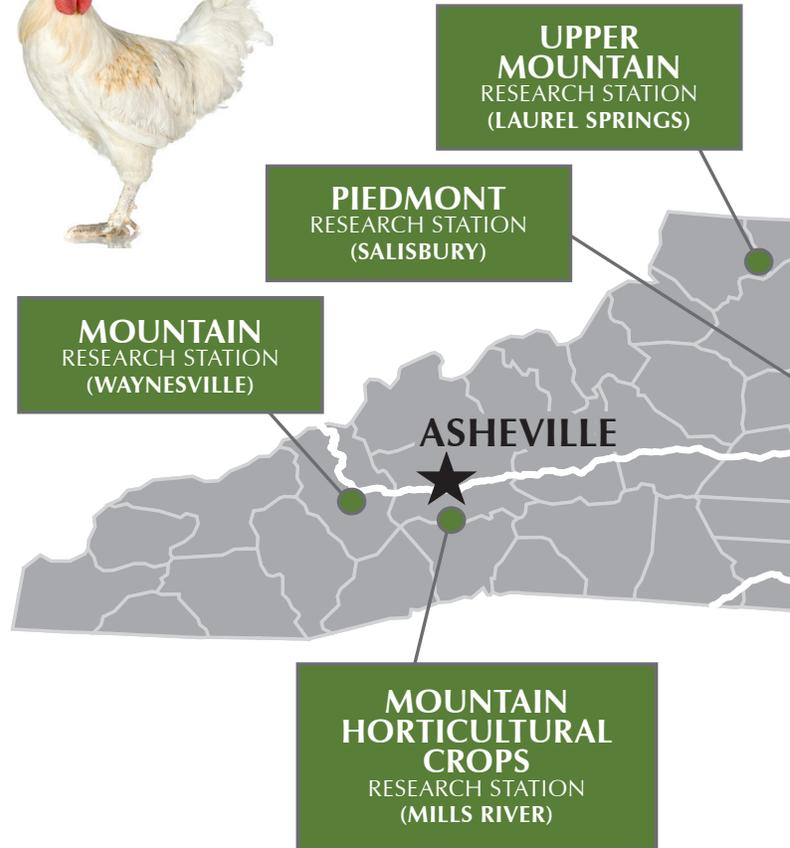
\* Events and meetings related to station activities that included an opportunity to share information.



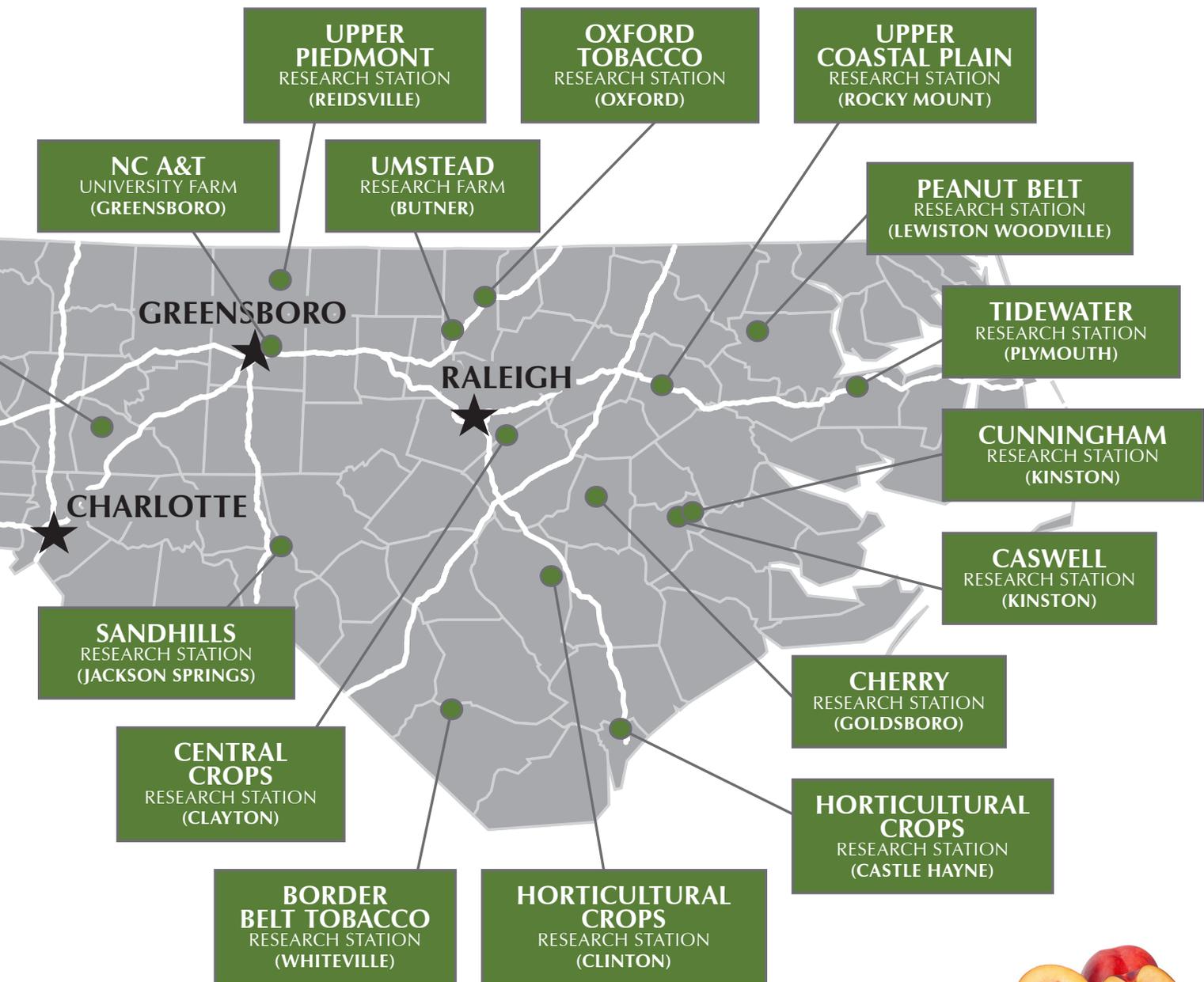
# NORTH CAROLINA RESEARCH STATIONS

*\* Items in bold are primary reasearch interests*

<p><b>BORDER BELT:</b> Field Crops (<b>Tobacco</b>, Soybeans, Corn, Peanuts, <b>Small Grains</b>)</p>
<p><b>CASWELL FARM:</b> Field Crops (<b>Soybeans</b>, <b>Corn</b>, Wheat), <b>Organic Crops</b> (Soybeans and Cotton), Invasive Weed Ecology, Native Grasses</p>
<p><b>CENTRAL CROPS:</b> Field Crops (<b>Corn</b>, <b>Soybeans</b>, <b>Cotton</b>, Small Grains), Tobacco, Swine, Horticultural Crops (Melons, Peaches, Apples, <b>Strawberries</b>, Sweet Potatoes, Squash), Canola</p>
<p><b>CHERRY FARM:</b> Grass-based Dairy, Beef, <b>Antibiotic-free Swine</b>, Corn, Soybeans, Cotton, <b>Specialty Crops</b>, Organic Farming, Goats, Wetlands Restoration, Waste Composting, Riparian Buffers</p>
<p><b>CUNNINGHAM/LOWER COASTAL:</b> Tobacco (<b>Flue-cured</b>, Burley, Dark Air-Cured), Horticultural Crops (Brambles, <b>Melons</b>, Watermelons, <b>Sweet Potatoes</b>, Lettuce, Cabbage, Squash, Cucumbers), Corn</p>
<p><b>HORTICULTURAL CROPS, CLINTON:</b> Horticultural Crops (<b>Cucumbers</b>, Melons, <b>Sweet Potatoes</b>, <b>Peppers</b>, Blueberries, Grapes, Strawberries, Watermelon, Tomatoes), Field Crops (Soybeans, Corn)</p>
<p><b>HORTICULTURAL CROPS, CASTLE HAYNE:</b> <b>Blueberries</b>, Strawberries, Grapes, Cucumbers, Watermelon, Woody Ornamentals, Woody Fruit Species, <b>Sea Oats</b>, <b>Coastal Beach Grass</b></p>
<p><b>MOUNTAIN:</b> Specialty Crops, Christmas Trees, <b>Heirloom Tomatoes</b>, Forages, <b>Beef</b>, Wheat, Corn, <b>Burley Tobacco</b>, Alternative Crops</p>
<p><b>MOUNTAIN HORT:</b> <b>Tomatoes</b>, Ornamentals, <b>Apples</b>, Peaches, Strawberries, Blueberries, Brambles, Peppers, Cucurbits, Soybeans, Corn, <b>Aquaculture</b>, <b>Greenhouse Production</b></p>



<p><b>OXFORD TOBACCO:</b> <b>Tobacco</b>, Tobacco Diseases, Tobacco Germplasm, Cucumbers, Melons, Paulownia Trees, <b>Biofuel Feedstocks</b></p>
<p><b>PEANUT BELT:</b> <b>Peanuts</b>, <b>Corn</b>, <b>Cotton</b>, Wheat, Soybeans, Cucumbers, Melons, Snapbeans, Sorghum, Sage, Fescue</p>
<p><b>PIEDMONT:</b> <b>Poultry</b>, <b>Dairy</b>, Corn, Soybeans, Hay, <b>Small Grains</b>, Wheat, Tomatoes, Strawberries, Caneberries, Blueberries, <b>High Tunnel Production</b></p>
<p><b>SANDHILLS:</b> <b>Peaches</b>, Blueberries, <b>Turfgrass</b>, Corn, <b>Soybeans</b>, Caneberries, Peppers, Strawberries, Ornamentals, Peanuts, Sweet Potatoes, <b>Cotton</b>, Rye</p>
<p><b>TIDEWATER:</b> <b>Soybeans</b>, <b>Corn</b>, <b>Cotton</b>, Aquaculture, <b>Swine</b>, <b>Beef</b>, <b>Irish Potatoes</b>, Rice, Canola, Sweet Sorghum, Small Grains</p>



**UMSTEAD:** Forestry, Water Quality, Biofuel Feedstocks, Weed Management, **Forage Production**

**UPPER COASTAL PLAIN:** Peanuts, **Cotton**, Soybeans, Corn, **Tobacco**, Cucurbits, Small Grains, Switchgrass, Trees, **Weed Management**

**UPPER MOUNTAIN:** Beef, Goats, Christmas Trees, Strawberries, **Brambles** (Raspberries, Blackberries), Blueberries, **Burley Tobacco**, Small Grains, Mushrooms, Organic Crops, Ornamentals

**UPPER PIEDMONT:** Grapes, **Beef**, **Tobacco (Flue-cured, Burley & Dark)**, Paulownia Trees, Wheat, Canola, Biofuel Feedstocks, Turf, **Meat Goats**

**A&T UNIVERSITY FARM:** Swine, Poultry, **Specialty Crops**, Organic Crops, Goats, **Waste Management**, **Constructed Wetlands**, Soil Quality





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