

## **Sustainable Farming in Contemporary North Carolina** <sup>[1]</sup>

### **Sustainable Farming in Contemporary North Carolina**

by Jennifer Daniel, December 2023



"An extension agent talks with an extension intern at a lab in the plant sciences building on Centennial campus. Photo by Marc Hall." Image and caption courtesy NC State University.

<sup>[2]</sup>Regenerative agriculture is a sustainable, multi-pronged approach to farming designed to reverse climate change. It first emerged as a movement in the Midwest in the 1990s <sup>[3]</sup> as the need to return to the holistic soil improvement practices found on pre-World War II farms became increasingly clear. Regenerative agriculture aims to boost crop yields by focusing on soil biology, instead of relying on synthetic fertilizers. Practicing crop rotation with sesame, building soil carbon with organic matter, and cover cropping are some ways contemporary North Carolina farmers <sup>[4]</sup> have created sustainable agriculture.

#### **Crop Rotation Using Sesame**

North Carolina farmers have long-embraced crop rotation — “the practice of planting different crops sequentially on the same plot of land to improve soil health, optimize nutrients in the soil, and combat pest and weed pressure”, as defined by the Rodale Institute. Crop rotation has been routinely used in farming since before the common era. The “Live-at-Home” program <sup>[5]</sup>, launched by Governor O. Max Gardner <sup>[6]</sup> in 1930 as an effort to enhance agriculture across the state, emphasized and popularized the practice. As of 2023, farmers in sixteen North Carolina counties — Anson, Bladen, Currituck, Greene, Halifax, Johnston, Martin, Moore, Nash, Pitt, Rowan, Sampson, Stanly, Union, Wayne, and Wilson — heavily used sesame, an ancient oilseed crop, in crop rotation and sustainable farming.

In 2023, several farmers planted and harvested sesame as work continued to show viability as a crop. The New and Emerging Crops Program, administered by the state Department of Agriculture and Consumer Services <sup>[7]</sup> (NCDA&CS), helped sesame fields in North Carolina thrive. In 2022, zero acres of the crop were documented. The New and Emerging Crops Program increased the acreage to 2,259 planted acres. Sesame is traditionally harvested in October, and local farms reported initial successes <sup>[8]</sup> as of 2023. Sesame has many uses, and its popularity helped support North Carolina’s agribusiness economy. In addition to being used to make foods like hummus and tahini, sesame (specifically sesame oil) is also used to manufacture cosmetics.

#### **Sesame in North Carolina’s Traditional Row Cropping Systems**

Despite being mostly grown in the West and Midwest of the United States, sesame is actually very well-suited to the sandy soils found in Eastern North Carolina and the Sandhills. According to North Carolina State University Assistant Professor David Suchoff <sup>[9]</sup>:

"We see that it fits very well into our traditional row cropping systems, meaning it can be put in rotation with corn and soybeans and sweet potatoes and so on. It doesn't really require farmers to purchase any new equipment. So, if they're already producing small grains, they have everything they need to grow and harvest this crop."

Sesame’s place in North Carolina agriculture has been studied since at least 2020. According to Hunter Barrier <sup>[10]</sup>, superintendent of Horticultural Crops Research Station at Clinton, NC:

"We put the first sesame test plots on our research stations in 2020. We had zero acres of commercial production. And I think this year, we're going to be somewhere between three and 5,000 acres. We're always looking for new crop

opportunities, both from a financial stability point and because the weather and climate are changing. To be able to have crops that are more drought tolerant than a [sic] yield and have a reasonable cost of production, we always need to be looking out for that”.

Sesame is also resistant to root-knot nematodes <sup>[11]</sup>, which are small, worm-like animals that attack numerous other crops. They are common in Coastal Plains agriculture in North Carolina.



**Nematode nodules on a vegetable plant's roots. Image courtesy of Wikimedia Commons.**

#### <sup>[12]</sup>**Building Soil Carbon with Organic Matter**

North Carolina farmers have also increasingly realized the importance of enriching the soil with organic matter in order to increase carbon reserves. Carbon plays a key role in soil function and productivity, and is crucial to creating healthy soil conditions. Gary Hendrix, a farmer from Raeford, NC, documented the positive effects of increased organic matter in farming in NC State University's College of Agriculture and Life Sciences Magazine <sup>[13]</sup>. As of 2023, Hendrix's farms consisted of roughly 8,000 acres of rotating crops in the Sandhills <sup>[14]</sup>. He stated:

“Organic matter softens the land. We strip-till and cover crop, especially to improve marginal land. Increasing organic matter has increased yield on our best soils and made others (produce more consistently) each year.”

Increasing soil carbon is also beneficial for moisture retention, with long-term carbon sequestration being a secondary benefit. By infusing soil with organic matter, farms are better able to cope with disturbances and challenges like droughts in the long term.

### **Cover Cropping**

Cover cropping is another tool contemporary North Carolina farmers have used to prevent soil degradation and nutrient loss. In 2023, 12% of farms in the state used cover crops (plants used to cover the soil rather than for harvest). However, according to NC State sustainable agriculture researcher Chris Reberg-Horton, cover crops are unpredictable. “There’s a frustrating lack of simple answers in cover crop use. An infinite number of variables affect performance.” To clarify these variables, Reberg-Horton and other researchers examined artificial intelligence and its uses on agriculture. As of 2023, Reberg-Horton's Precision Sustainable Agriculture Network <sup>[15]</sup> worked to develop web-based decision tools designed to provide information on various cover crop species, nitrogen supply, weed suppression, greenhouse gas emission, and soil carbon sequestration.

Practicing crop rotation with sesame, building soil carbon with organic matter, and cover cropping are all key ways contemporary North Carolina farmers have embraced sustainable agriculture. These tools, along with artificial intelligence, have helped farmers in North Carolina improve the practice of agriculture for future generations.

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