



University of Missouri

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[Home](#) » [Winter 2012](#) » [Features](#) » [Cleaning up cotton](#)

## Cleaning up cotton

### **Cotton becomes more sustainable from both business and environmental perspectives.**

Story by Stephanie Detillier | Photos by Rob Hill

Scott Andrews spent his childhood getting significant on-the-job training. During fall break, he picked cotton end-rows on his grandfather's farm. For each pound, he earned about 3 cents — a good wage for a kid and good experience for a future cotton farmer.

*Adobe Flash version 8, or higher, and Java Script are required to view the slide show for this feature story.*

Today, Andrews, BS Ag '76, continues his family's cotton legacy on a century-old farm in southeast Missouri. Part of his 900 acres dates back as far as his great-grandfather W.G. Petty, who managed to hold on to the property through the Great Depression. But much has changed since then, including nearly all cotton farming practices, which have become more sustainable from both business and environmental perspectives.

For starters, the amount of human labor needed to produce cotton dramatically decreased with the advent of the mechanical cotton picker. "When my dad went to college, he had decided he didn't want to get involved in a business that relied on hand laborers," Andrews says. "About the time he started farming, he bought one of the first machines from International Harvester in 1952."

Critics argue that the reliance on mechanized equipment, irrigation systems and pesticides adversely affects cotton's environmental footprint. But a closer look at the industry shows that technological innovations, especially genetically engineered seeds, have led to a decrease in pesticide use, soil loss, land use and water use. The Keystone Alliance for Sustainable Agriculture reports that from 1987 to 2007, energy used to produce a pound of cotton lint decreased 66 percent. That's not to mention the decrease in human labor.

As innovation has led to more efficient cotton practices, Andrews has seen his cotton yields nearly double since 1980, meaning more cotton can theoretically be produced on less land.

“The yields are better because the plants are better,” he says. “The seeds cost so much more than they used to. We used to pay \$8 to \$10 an acre for seed, and now it’s \$80 an acre, but we’re saving so much in chemicals that it offsets the costs.”

Through cross-breeding and genetic modification, seeds have become more resistant to drought and pests such as worms and weeds. Cotton seed varieties with the Bt gene, for example, produce insecticidal proteins that help protect crops from insect pests and reduce the need for spraying.

Andrews hires Victor Roth, BS Ag '74, of Roth Farm Service to inspect his fields once a week. His philosophy is to spray only as needed, where needed. For the 2011 crop, one 40-acre field needed to be sprayed six times; another field only once. “We don’t have whole-hog spraying,” he says. “That means we don’t see a bug on the windshield of a truck and spray the whole farm. If we sprayed helter skelter, that would just upset nature.”

The farmer-supported Boll Weevil Eradication Program, a cross-country effort of the U.S. Department of Agriculture, has also led to yield increases of at least 10 percent and a 40 percent to 100 percent reduction in insecticide use.

Throughout his life, Andrews has witnessed not only environmental improvements but also improvements to cotton farmers’ quality of life. In addition to the back pains and bloody fingers that once accompanied cotton picking, the pesticides of the past created hazards as well. He remembers the more toxic substances that were relied on when he was young. A skull-and-crossbones label was sometimes seen on pesticide jugs back then. Prior to that, in the 1900s, pounds of lead arsenate were spread per acre compared to the ounces of pesticides used today.

When determining which cotton varieties to plant and pesticides to use, Andrews turns to the University of Missouri’s T.E. “Jake” Fisher Delta Research Center, which celebrated its 50th anniversary in September 2011. The center, located in Portageville, Mo., studies cotton, rice and soybean production as well as weed, insect and disease control in crops. Each year, Andrea Jones, a Delta Center research associate, releases a cotton crop performance report based on her variety trials at four southeastern Missouri locations. At the end of the season, each seed variety is graded on its yield, fiber length, fiber strength, waste content and other factors. In the 1980s, the center used some of the Andrews’ sandy loam soil fields to conduct the study.

Farmers wait for the report each winter. “The seed companies do these tests themselves, but we all like to hear an unbiased opinion,” Andrews says. “We all trust the University of Missouri’s research. They have a field day in early September that a lot of us go to, and we’re able to see the different varieties of cotton when they’re close to harvest time. In the winter, we use the information they put together in deciding what varieties to plant or chemicals to use.”

Jones says the staff is currently testing Environmentally Smart Nitrogen (ESN) fertilizer, controlled-release nitrogen granules that reduce fuel usage and nitrogen released into the environment. “What ESN lets us do is take only one trip across the field with the nitrogen, which it releases throughout the season,” she says.

The Delta Center serves a prime cotton-growing territory. Although only seven counties in the southeastern part of the state grow cotton, Missouri ranks ninth in the nation for cotton production. The Bootheel conditions are ideal for cotton. Andrews' farmland was originally Mississippi River Delta flood plain drained back in the early 1900s. The water table is quite high. While many farmers dig a 100-foot well for irrigation water, Andrews says that the water table on his land is only 20 feet down.

To improve the crop's sustainability, farmers have also started recycling cotton trash. As cotton is being ginned, the seeds removed are sold for cattle feed. But leaf and stem particles removed from the lint form a mountain of unwanted compost.

"When I was a kid, the gin burned the byproduct all fall," he says. "They thought that was the thing to do. Now we pay to have it hauled from the gin, back to the farm. We put it on the sorriest, sandiest ground. It adds organic matter back into the land and makes a big difference." In addition to being used as an organic fertilizer, the waste also has potential as a source of biomass energy.



For Andrews, who has an almost entirely cotton wardrobe, taking up the family business was a no-brainer. And so was attending Mizzou, where his father graduated and mother attended. When he moved to Columbia, he knew he would soon return to Kennett, Mo., but wanted to continue the family's heritage at Mizzou. Andrews' daughter Laurie, BES '06, has already carried out one family tradition, and Andrews expects that cotton farming will continue another generation as well.

"Although harvest is a lot of work, it's also a lot of fun. It's so rewarding to see that big module of cotton that's going to turn into a truckload of blue jeans, shirts or towels. To see a field of snowy white cotton, there's nothing like it."

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