

# Using Cover Crops and Conservation Tillage to Increase Water Availability:

A Resource Guide

NRCS/SWCS photo by Lynn Betts

## ► CONSERVATION TILLAGE CAN REDUCE WATER USAGE BY 15%

Cover crops and conservation tillage, when properly managed, can improve water availability for critical summer cash crops. Conservation tillage and cover crops are natural partners, working above and below the ground by loosening compacted soil, increasing pore space to add water-holding capacity and building organic matter over time. It's been shown that having soil cover significantly reduces erosion and helps keep your inputs right where you want them.

This guide will help you learn more about the benefits of implementing a conservation tillage program that

can help reduce water and nutrient applications, build overall soil health and improve your long-term bottom line. Your local soil management expert can help you implement a conservation tillage program that is right for your farm and your farm budget.

## ► COVER CROPS PERFORM TILLAGE FUNCTIONS, JUST WITH MORE BENEFITS

You've probably heard a lot about cover crops and conservation tillage, but you might not have heard all the benefits they can bring to your operation:

- 1 Reduces labor, saves time** – once you plant your cover crop (prior to Oct. 31), you won't enter the field until four weeks before planting. Conventional-till farmers might till a few times during winter to break up the soil, spray for weeds or set up erosion trenches.
- 2 Reduces machinery wear and saves fuel** – there's no need to run the tractor in the winter months, so expect to save hours of machinery use and fuel costs.
- 3 Increases organic matter** – residue break-down captures carbon and builds organic matter over time.



*A young peanut crop benefits from 4 to 6 inches of deep cereal rye cover crop residue.*

Photo courtesy of Dr. Gary Hawkins

► **“Conservation tillage provides several long-term impacts that can reduce your inputs annually and save money, all while building up your soil structure, soil moisture, and your organic material over time as well.”**

– Perri Campis, executive director of Flint River Soil and Water Conservation District

## GEORGIA FARMER'S VIEW OF COVER CROPS

Clayton Anderson, a grower from Bulloch County, Georgia, farms cotton, corn and peanuts in a five-year rotation. Once his commodity crop is harvested, he plants a cover crop mix, including cereal rye, Cousaque black oats and FIXation balansa clover, from “fence post to fence post.”

“I plant clover and cereal rye until November 1, then I plant straight rye because it takes the clover a little longer to mature,” explained Anderson. “I spray Roundup and 2,4-D before drilling my cover crops right into the standing cotton stalk stubble. I use a 20-foot Great Plains double-disc drill. I get rid of winter weeds first because if you plant into them, the winter weeds will compete with your cover crop and overall stand.”

### Why plant a cover crop?

“I plant cover crops because it’s the right thing to do. It cleans the air and water, reduces erosion, mines the nutrients in the soil, and builds up organic matter,” he said.

It also allows Anderson to grow his commodity crops without irrigation. “When it rains, the soil really holds the water,” he noted. “This year, I was in the driest spot in the state, but I still made a crop because my soil held on to every ounce of water. My bottom line probably looks better than some of the people who made a higher yield with irrigation.”

Anderson recommends creating a cover crop plan, getting organized and staying dedicated to the process. “The environmental and soil health benefits of cover crops are worth the time and effort,” he said.



**4 Reduces soil erosion and improves water quality** – erosion is dramatically reduced or stopped.

**5 Improves soil tilth** – promotes a healthy soil biome, including fungus, microbacteria, earthworms; their excretions help hold the soil together better, which builds soil tilth.

**6 Traps soil moisture to improve water availability** – as the winter cover crop decays, it creates channels that allow more water to flow deeper into the soil profile.

**7 Weed suppression** – leaving residue on top of your field and in between

plants will limit sunlight exposure and weed growth.

### ▶ COMMON COVER CROPS IN SOUTHERN GEORGIA

The two most common cover crops in southern Georgia are cereal rye and winter wheat. For growers just getting started, Dr. Gary Hawkins, University of Georgia professor of water resource management, suggests using winter wheat because wheat doesn't get as tall as cereal rye. Cereal rye can grow 4 to 6 feet whereas wheat only grows 2 to 3 feet tall. Starting with a lighter residue crop as you learn how to set up the equipment

▶ **“Research shows conservation tillage can increase the water holding capacity of soil and can increase the time required between wetting events as well as increase water infiltration.”** – Dr. Gary Hawkins, University of Georgia professor of water resource management

Every **1%** increase in organic matter results in as much as **25,000** gallons of available soil water per acre

and cut the soil will make the first year an easier transition.

Other common cover crop options are clover and ryegrass and each come with their own considerations. Clover will require a different herbicide regimen than cereal rye or winter wheat. Ryegrass, often used as a perennial grass, can be more difficult to terminate. Some experienced cover crop growers combine two or more cover crops. For example, a grower using cereal rye may decide to add in oats, which has more biomass. As each farm operation is unique, local agricultural agents can help you make the best decision for your farm operation.

### ► IMPROVING SOIL HEALTH CAN PAY LONG-TERM DIVIDENDS

Following a conservation tillage program can improve overall soil health, including building soil organic matter and improving water holding capacity over the long-term. Aboveground, residue is left on the soil surface. Underground, the root system growth breaks up the soil profile. As the aboveground and belowground residue breaks down through animal (earthworm), fungus or root decay, the residue is converted to humus and builds soil organic matter.

In southern Georgia, soil types vary from field to field, and organic matter is typically low. Georgia's temperature and humidity allow microorganisms—fungus and bacteria—to break residue down quickly, which doesn't allow it to naturally build up organic matter very fast. With many of the local soil types, building up to 2% to 3% organic matter can be

a challenge and will take a long-term commitment. To recognize improvements to the level of organic matter in your soil, you need to know the current level of your soil today. Your local agriculture agent can help you identify the best test for your soil, interpret the findings and help you decide what organic matter increasing practices are best for your operation.

Those who do practice conservation tillage and begin to build organic matter will also see an increase in water availability. Soil organic matter holds 90% of its weight in water. Organic matter acts as a sponge by trapping soil nutrients and moisture in place. Increased soil tilth also provides more channels that can hold moisture. This can improve water availability for the summer crop.

According to the U.S. Department of Agriculture (USDA), one percentage point increase in organic matter results in as much as 25,000 gallons more water holding capacity per acre, or the equivalent of nearly 0.75-acre inches of water.

Recent research, led by Dr. Hawkins, was conducted on two fields with Tifton sandy loam soil to determine the rate of soil moisture loss in a conservation-till system versus a conventionally tilled method. When dry, the conventional-till soils lost moisture at a rate 2.5 times that of the conservation-till soils. This means water would need to be supplied to the conventional-till soils every 1.5 days whereas the conservation-till soils would need water every 3.9 days.

## ► REDUCE SOIL EROSION BY 60% TO 90%

Conservation tillage can reduce or stop soil erosion, depending on the amount of rainfall, by first stopping “splash” erosion from occurring on the soil. Then, the residue on the surface absorbs the energy from the raindrops and allows the water from the raindrop to gently run down the residue to the ground. Residue also slows the velocity of the water down into the soil profile, allowing for better infiltration and reduced erosion. Erosion is not stopped all the time, but the water that does runoff has very little or no sediment being carried off the field.

## ► INCREASING AVAILABLE CROP NITROGEN

The use of cover crops helps increase available nitrogen in a few ways. First, cover crops help with the “mining of nutrients.” If any nutrients leach below the commercial crop’s root zone, they can potentially be “harvested” by the cover crop. When the cover crop dies and converts into organic matter, the nutrients—nitrogen, phosphorus, potassium and micronutrients—are returned to a higher location in the soil profile where

they are more available to the crop.

Second, a grower can plant a cover crop that specifically targets nitrogen-fixing to the plant. A common nitrogen-fixing cover is clover, but other legume crops could be grown, like lupin or sunn hemp. Since peanuts are a legume, this cash crop can help with nitrogen fixation, but if growers turn the soil over, the denitrification process removes some of the built-up nitrogen.

## ► GETTING STARTED IS EASY

Ready to get started? Our experts recommend starting simple with winter wheat. It’s an easy crop to grow with a deep-root system that produces a lot of biomass. Regardless of whether you go no-till or strip- or mulch-till, the underground root biomass will begin to increase your soil organic matter.

If you aren’t ready to purchase equipment yet, the Flint River Soil and Water Conservation District own a no-till drill that can be rented.

Conservation tillage is a low-cost, low-hassle program that can yield huge benefits over the long-term.

Let your local soil experts help you make the most efficient management decisions for your farm operation. To request a free on-farm consultation from the Southeast Aquatic Resources Partnership (SARP) and the Flint River Soil and Water Conservation District, call 913-438-0771 or email [SARP@trustinfood.com](mailto:SARP@trustinfood.com) today.

You can also go online to learn more about conservation practices, such as increased irrigation management and enhancing soil health, and request a free on-farm consultation by visiting [www.trustinfood.com/irrigationstation](http://www.trustinfood.com/irrigationstation).



SARP is a regional collaboration of natural resource and science agencies, conservation organizations and corporations working together to strengthen the management and conservation of aquatic resources in the southeastern United States.

The Flint River Soil and Water Conservation District is a state agency based in southwest Georgia dedicated to the stewardship of natural resources for future generations and the exploration of conservation-driven technologies and strategic partnerships that enhance agricultural sustainability.

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