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Conservation-Practice Adoption Rates Vary Widely by Crop and Region

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What Is the Issue?

Conservation practices can reduce adverse effects of agricultural production on environmental quality, help improve soil health, and reduce net greenhouse gas emissions. These benefits can be realized when farmers keep the soil covered, minimize soil disturbance, and diversify planting with crop rotations and cover crops. No-till, strip-till (tilling only a narrow strip where row-crops are planted), and cover crop practices can provide a suite of benefits, including reducing sediment and nutrient loads in water. When used continuously over a number of years, they can also increase soil organic matter and carbon sequestration, improve soil structure, reduce soil compaction, and increase water infiltration and water-holding capacity—additional improvements that are often associated with enhanced soil health. Nutrient (fertilizer)-management practices can help ensure the crops have the nutrients they need while minimizing the opportunity for nutrients to be lost to the environment through runoff, leaching, or volatilization.

This study provides a snapshot of no-till and strip-till adoption, planting of cover crops, and nutrient management—practices that are supported by USDA conservation programs and are likely to be critical in meeting climate change adaptation goals under the USDA Climate Change Adaptation Plan.

What Did the Study Find?

Examining data on land planted to corn, soybean, wheat, and cotton reveals conservation-practice adoption rates vary widely across regions and crops. In general, southern and eastern regions use no-till/strip-till and cover crops more intensely than other regions. Even within individual farms, practice adoption can vary.

- Roughly 40 percent of combined acreage of corn, soybean, wheat, and cotton were in no-till/strip-till in 2010-11 (89 million acres per year), with adoption rates higher for some crops (e.g., soybeans) and some regions (e.g., the Southern Seaboard). (See figure.)
- Fifty-six percent of all land used for corn, soybeans, wheat, and cotton was on farms that used no-till/strip-till on at least part of their cropland in 2010-11: 23 percent of land was on farms that used no-till/strip-till on all land in these crops while 33 percent was on farms that used a mix of no-till, strip-till, and other tillage practices.
- Fall application of nitrogen (applying nitrogen in the fall before spring planting, which leaves the nitrogen vulnerable to runoff) accounted for 20 percent of nitrogen applied to corn in 2010 (29 percent of acres). Cotton producers applied only 7 percent (on 14 percent of acres) in the fall of 2007.

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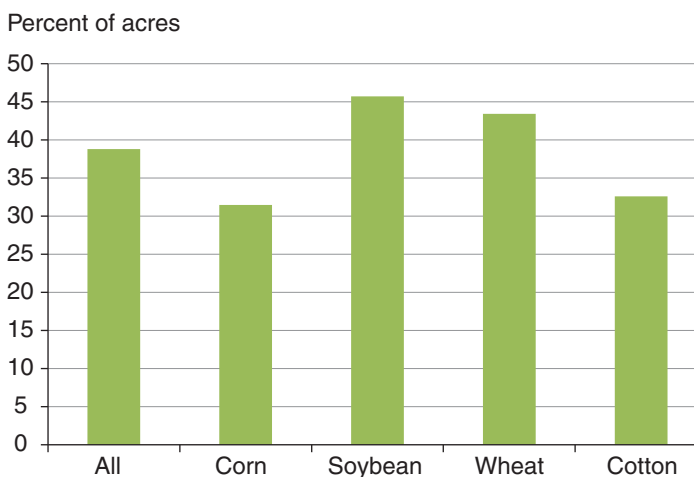
- Split application of nitrogen fertilizer (applying at least part of the total nitrogen after planting when crop needs are highest and risk of runoff is lower) accounted for 59 percent of nitrogen applied to cotton in 2007 (64 percent of acres). In 2010, corn farmers applied 22 percent of nitrogen fertilizer (on 31 percent of acres) after planting.
- Farmer-reported nitrogen rates are higher than benchmark application rates (based on estimated plant uptake and designed to minimize nitrogen losses to the environment) for 36 percent of corn acres, 19 percent of cotton acres, 22 percent of spring wheat acres, and 25 percent of winter wheat acres.
- Using multiple nutrient-management practices has greater potential to reduce the loss of nitrogen than using a single practice. Only 24 percent of cotton acres and 6 percent of corn acres combined four nutrient-management practices: (1) no application in the fall, (2) some application after planting, (3) nitrogen application at rates below a “benchmark,” and (4) fertilizers incorporated or injected below the soil surface.
- Cover crops were in use on less than 2 percent of total cropland (for all crops) during 2010-11 (6.8 million acres), with adoption rates higher in some regions (e.g., the Southern Seaboard and the Mississippi Portal). Although the benefits of cover crops and no-till/strip-till are enhanced when these practices are used on the same fields, the low cover crop adoption rate suggests that these benefits are realized on few acres.

How Was the Study Conducted?

All the data presented are from the Agricultural Resource Management Survey (ARMS), a joint enterprise of USDA’s National Agricultural Statistics Service and the Economic Research Service. Data on tillage and cover crops are from a special section of the farm-level portion of the 2010 and 2011 surveys. Farmers were asked to report the acreage of corn, soybean, wheat, and cotton where no-till/strip-till were used and the acreage of all cropland that had cover crops in the survey

year. While previous studies suggest that many farms use no-till/strip-till on only a part of their cropland, the 2010-11 ARMS data provide a broad, national perspective on adoption at the farm level. Data from the crop-specific, field-level portion of the ARMS survey were used to report on nitrogen-management practices for corn, wheat, and cotton producers. While the field-level surveys do not provide a farm-level picture of nitrogen management practices, the field-specific data provide extensive detail on application rates, timing, and methods. Conservation-practice adoption rates are estimated using farm-level and field-level surveys and presented by crop, region, farm type, commodity specialization, land tenure, and operator education.

No-till or strip-till use on all acres of four major crops, 2010-11



Source: USDA, Economic Research Service and USDA, National Agricultural Statistics Service, Agricultural Resource Management Survey, 2010-11.