

United States Department of Agriculture



# Residue and Tillage Management -

## No Till/Strip Till/ Direct Seed

Alabama NRCS Guide Sheet No. AL329



### Definition

Residue and tillage management--no-till/strip-till/direct seed is managing the amount, orientation, and distribution of crop and other plant residue on the soil surface year round, while limiting soil-disturbing activities to only those necessary to place nutrients, condition residue and plant crops.

**No-Till:** The residue is left undisturbed from harvest through planting except for narrow strips that cause minimal soil disturbance, such as injecting anhydrous ammonia. No-till typically results in less soil surface being disturbed by tillage operations.

**Strip-Till:** The residue is often left undisturbed from harvest through planting. These strips are clear of residue or tilled for warming, drying, or deep tillage purposes either before or during the planting operation. This practice is often used when a hard pan, traffic pan, or other soil compaction conditions require deeper tillage in the row.

### Purpose

This practice is applied as a part of a conservation management system to support one or more of the following:

- Reduce sheet and rill erosion
- Reduce wind erosion
- Improve soil organic matter content
- Reduce CO<sub>2</sub> losses from the soil
- Reduce energy use
- Increase plant-available moisture
- Provide food and escape cover for wildlife

### Conservation Management System

Residue and tillage management systems such as no-till and strip-till are established as a part of a conservation management system consisting of structural and management practices to maintain the productivity and condition of the soil.

Crop rotation, cover crop, integrated pest management, nutrient management, various structures, and buffer practices are used in resource management planning to address the natural resource concerns identified during the planning process. This practice applies to all cropland and other land where crops are grown.

### Specifications

- Residue to be retained on the field shall be uniformly distributed. Combines or other harvesting machines shall be equipped with spreaders capable of distributing residue over at least 80 percent of the combine header width.
- Residue shall not be burned
- Partial removal of crop residue by baling or grazing shall be limited to retain the amount of residue needed to achieve the intended purpose(s).
- No full-width tillage shall be performed regardless of the depth of the tillage operation.
- No more than 1/3 of the row width shall be disturbed from harvest through planting by nutrient injection, row cleaning, planting, or other operations.

## Guide Sheet No. AL329 - 2

- A minimum of 30 percent of the soil surface shall be covered by plant residue immediately following the planting of the crop. (Additional crop residue is often needed to reduce soil erosion levels to the soil loss tolerance ("T") value, increase soil organic matter content, improve water quality, and to meet other resource objectives. Additionally, the annual Soil Tillage Intensity Rating (STIR) value for all activities during the crop interval shall be no greater than 30. The STIR is an index used to evaluate the kind, severity and number of ground disturbing tillage passes on soil quality.
- Row cleaners may be attached to the planters to move residue out of the row area and help warm and dry the seedbed.
- Fertilizer injectors, manure injectors, and similar equipment may need to be modified to operate in high residue situations.
- Weed control techniques must be carefully planned, yet sufficiently flexible, to complement the system. Burndown herbicides applied at least two weeks prior to planting will kill the cover crop, weeds, and other vegetation that may compete with the crop and deplete the soil moisture. All pesticides used will be labeled for intended use.

### Planning for the Intended Purpose

#### All Purposes

No-till and strip-till may be practiced continuously throughout the crop sequence or may be managed as a part of a system that includes other tillage and planting methods such as mulch-till.

Production of adequate amounts of crop residues necessary for the proper functioning of this practice can be enhanced by selection of high residue producing crops and crop varieties in the rotation, cover crops, and adjustment of plant populations and row spacing.

The three key elements in making no-till or strip-till work are (1) controlling pests (weeds and insects), (2) nutrient management, and (3) proper planting.

Consider the need for other practices in conjunction with no-till or strip-till during the planning process. For example, consider the need for grassed waterways and/or terraces where erosion by concentrated flow is a problem.

Consider soil adaptability for no-till or strip-till. No-till might not be a good choice on poorly drained soils.

#### Reduce Sheet and Rill Erosion

The amount of residue needed and the amount of surface soil disturbance allowed to reduce erosion to any planned soil loss objective shall be determined using the current approved water erosion prediction technology. In most cases at least 50 percent residue cover provides protection against sheet and rill erosion to acceptable levels. Contact your NRCS technician for help in estimating your percent cover at planting.

#### Reduce Wind Erosion or Reduce Soil Particulate Emissions

Maintaining residue cover during critical periods of growing season can reduce crop damage caused by wind erosion. Partial removal of residue by means such as baling or grazing shall be limited to retain the amount needed to reduce wind erosion damages.

#### Improve Soil Organic Matter Content

The amount of residue needed and the amount of surface soil disturbance allowed to achieve the desired soil condition, shall be determined using the current approved soil conditioning index procedure and result in a positive trend. At least 50 percent residue cover is needed to sustain soil organic matter. Contact your NRCS technician for help in estimating the level of residue at planting.

#### Reduce CO<sub>2</sub> Loss from the Soil

Limiting the kind, severity and number of ground disturbing tillage passes will reduce the CO<sub>2</sub> losses from the soil. The annual Soil Tillage Intensity Rating (STIR) value for all activities during the crop interval shall be no greater than 20.

#### Conserve Soil Moisture

A minimum quantity of 50 percent residue cover shall be maintained throughout the year. Residue shall be evenly distributed and maintained on the soil surface. Additionally, the annual Soil Tillage Intensity Rating (STIR) value for all soil-disturbing activities in the cropping system shall be no more than 20.

#### Provide Food and Escape Cover for Wildlife

Residue height, amount, and time period shall be determined using an approved habitat evaluation procedure. Residues shall not be removed unless determined to not be detrimental to habitat values. The value of residues for wildlife habitat can be enhanced by leaving rows of unharvested crop standing at intervals across the field.

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