

Crop Residue Management

Nebraska Conservation Planning Sheet No. 4



revised December 2006

What is a crop residue management?

Crop residue management is year-round management of crop residue to reduce water and wind erosion, increase plant-available moisture, reduce off-site transport of sediment, nutrients and pesticides, maintain or improve soil condition, and provide food and escape cover for wildlife. It includes all field operations from harvest through planting that affect the amount, orientation and distribution of crop residue. It is a broad term that includes all types of residue and tillage management systems: no-till, strip till, direct seed, minimum till, mulch till, ridge till and many others. Below are some of the more common types of residue and tillage management systems.

No-till – Soil is left undisturbed from harvest until planting except for nutrient injection. Planters or drills should be equipped to plant through untilled residue. Fertilizer and manure placement is limited to low disturbance methods such as surface application or injection with narrow knives on 30 inch or greater spacing. Weeds should be managed with herbicides and/or using a crop rotation that minimizes weed pressure. Planting and fertilizer placement should not disturb more than one fourth of the row width.

Ridge till – Soil is left undisturbed from harvest until planting except for nutrient injection. Ridge till planters prepare a seedbed and plant in a single pass on top of the ridges with sweeps, disk openers, coulters, or row cleaning devices leaving a ridge after planting at least 3 inches higher than the furrow between ridges. Ridges are rebuilt during cultivation. Weed control is primarily accomplished by the row cultivation used to rebuild the ridges. However, herbicides may also be used to improve weed control.



Direct Seed – Direct seeding refers to farming systems that fertilize and plant directly into undisturbed soil in one field operation, or two separate operations of fertilizing and planting. It is similar to no-till except that the openers used to place fertilizer and seed are not limited to low disturbance methods. Direct seed operations should not disturb more than one third of the row width.

Strip till – Strip till is similar to no-till except that planters are equipped with multiple coulters, in row chisels, rotary tillers or similar devices designed to till a narrow strip. For strip till, planting and fertilizer placement should not disturb more than one third of the row width.

Mulch till – The entire soil surface is disturbed prior to planting. Tillage implements include stalk choppers, rotary hoes, field cultivators, chisels, disks, harrows and other non-inversion implements that leave a significant amount of residue on the soil surface. Weeds are controlled with herbicides and/or row cultivation.

How it helps the land

Crop residue management reduces soil erosion by wind and water. It helps reduce off-site transport of sediment, nutrients and pesticides, and can help conserve soil moisture and maintain or improve soil condition. Crop residue management also can provide food and cover for wildlife.

Where the practice applies

Crop residue management can be used on any cropland, especially where there is a need to reduce water and wind erosion and to conserve soil moisture. Crop residue management is most effective for water erosion control when used with other conservation practices like grassed waterways, contouring, stripcropping, terraces, or field borders. It is most effective for wind erosion control with other conservation practices like stripcropping, cross wind trap strips, herbaceous wind barriers, or field windbreaks. Other factors such as row direction and ridge height also influence the effectiveness of the practice in reducing wind erosion.

Where to get help

For assistance in planning and establishing a crop residue management system on your cropland, contact the Natural Resources Conservation Service office. Additional material on crop residue management is available from NRCS or the University of Nebraska-Lincoln Extension.

Crop residue management requirements of your conservation plan

Refer to your conservation plan and narratives in the plan detailing crop residue management options you selected for your fields. If you do not have a conservation plan, one can be developed with you at the local NRCS office.

Applying crop residue management

This practice is considered to be applied when residue is managed as specified. The critical time to maintain good residue cover is in the spring until a crop canopy covers the soil. NRCS considers how residue was managed from harvest until after planting and levels of residue during times specified in your conservation plan, to determine if a conservation plan is being applied.

Measuring ground cover

NRCS uses the following method to measure residue after planting:

- Use any line, rope or tape that is equally divided into 100 parts with a mark every 6 or 12 inches.
- Choose representative locations in the field.
- Stretch the line diagonally across the rows.
- Select a point on each mark along one edge of the line. Make sure to use the same point on each mark.
- Look straight down on each point. Do not count residue smaller than 3/32 inch in diameter.
- Walk the entire length of the line, rope or tape. Count the total number of points with residue under them. That count will be the percent cover for the field.
- Repeat the procedure at least five times in different areas of the field and average the findings.

Other considerations

Below are some general tips that will help you manage crop residue.

Cropping considerations

- Include multiple high residue producing crops and crop varieties in the rotation.
- Use cover crops when inadequate amounts of crop residue are produced or left after harvest.
- Higher plant populations and narrow row spacing increase the amount of residue after harvest.
- Increasing crop diversity by using spring and fall planted crops, small grains, legumes, and/or cover crops in conjunction with row crops is important in managing pests, increasing biological activity and providing long term sustainability.

Residue type

- Crop residue from low residue crops or crops with fragile residue provides less cover and is easily destroyed by tillage. Low residue crops include corn silage, sorghum silage, soybeans, dry edible beans, sunflowers, sugar beets and potatoes.
- Crop residue from high residue crops provides more cover and is not as easily destroyed by tillage. High residue crops include corn, grain sorghum, forage sorghum and other summer forage crops, and small grains.

Tillage considerations

- Delaying tillage operations after harvest until as close as possible to planting maximizes the benefits of this practice.
- Tillage implements designed to turn the soil over and implements which disturb the soil over their entire width tend to bury the most residue.
- Higher tillage speeds bury more crop residue.
- Tillage implements with a shallower operating depth leave more crop residue on the soil surface.
- Adjusting the operating angle of tillage equipment and using straight points or sweeps can reduce residue burial.
- Implement dealers and manufacturers can provide information on how to adjust, modify, and operate tillage implements to leave more crop residue on the soil surface.

Harvest considerations

- Combine spreader and chopper adjustments will affect the even distribution and size of the residue. Evenly distributed residue covers more soil surface.
- Baling and burning will reduce crop residue cover.
- Livestock grazing of crop residue will also reduce the amount of ground cover.

It's important to maintain the residue levels specified in your conservation plan every year.