



Natural Resources Conservation Service

Michigan



Residue Management

Conservation Treatment Effects-Cropland (MI)

The purpose of Residue Management as a conservation treatment is to manage the amount, orientation, and distribution of crop and other land residue on the soil surface year-round while growing crops in previous crop residue. It can be applied as part of a conservation management system to:

- Reduce soil erosion.
- Improve plant health.
- Improve soil quality.
- Provide benefits to wildlife.

Resource Setting:

Soil Type: Major soils are in the Capac-Marlette-Colwood Association, which are characterized as nearly level to undulating, well drained to somewhat poorly drained loamy soil. Critical soil erosion areas contribute to decreases in water quality in local streams by adding sediments, nutrients and pesticides. This farm had erosion rates of 6 to 9 tons per acre per year.

Solution: Residue Management, No-Till (329A) and supporting practices.

Transition from Conventional tillage to Residue Management, No-till:

- **Machinery Transition Costs**
A farm with older, depreciated machinery will have a lower impact on capital to sell conventional equipment and purchase no-till machinery. Selling machinery that is newer or has high debt on it will have a larger impact on the farm's capital. The farm may have capital losses on the equipment changes.
- **Time Lag for yield response**
In the first year of the practice, yields were especially low. It took three years to get yields back up to normal.
- **Night Crawlers as an indicator**
Conventional tillage practices decrease the lignin content of soil and therefore organic matter content. The number of worms present in soil decreases with the use of chemicals, such as atrazine, and the amount of organic matter or food. The farmer in this study used night crawlers as an indicator of soil condition. Since the residue management practice was started, the number of worms has grown exponentially. Worms aid in the turnover of organic material, increase infiltration of water, cycle nutrients, and increase the drainage, aeration, structure and air space of the soil.

For more information on this conservation treatment, contact your local NRCS Service Center.

On the web, find your local Service Center at: <http://www.nrcs.usda.gov>

Conservation Treatment Effects
Mid-Michigan Cropland Conversion tillage to Residue Management

Resource Setting- Family-owned farm, Cash Crop

Crop Rotation: 1-2 year corn, 1 year soybeans, 1 year wheat (subject to market conditions)

CONSERVATION TREATMENT:	RESOURCE ISSUES:
<ul style="list-style-type: none"> • Residue Management, No-till-(329A) • Conservation Crop Rotation-(328) • Critical Area Planting-(342) • Grade Stabilization Structures-(410) • Subsurface Drain-(606) • Nutrient Management-(590) • Pest Management-(595) 	<p>Wind erosion, water erosion, sheet, rill and gully erosion, weed control, low crop yields, surface and ground water concerns, soil compaction, low soil fertility and organic matter content, subsurface drainage</p>
POSITIVE EFFECTS +	NEGATIVE EFFECTS -
<ul style="list-style-type: none"> + Reduced Soil erosion <ul style="list-style-type: none"> • Decreased to 2 tons/acre/year + Improved soil quality: <ul style="list-style-type: none"> • Increase in soil fertility • Increased soil organic matter content by 2% • Increased water holding capacity and water infiltration rates of the soil • Increased carbon dioxide in soil, aided to a change in plant bio-mass • Reduced soil compaction • Reduced soil crusting • Increased number of night crawlers • Improve yield in drought years. + Improved water quality <ul style="list-style-type: none"> • Reduced sedimentation up to 7 tons/ac/yr + Sustained soil tilth and crop production resulted in increased yields on average. <ul style="list-style-type: none"> • Corn from 100 to 150 bu/yr. • Soybeans from 25 to 45 bu/yr. • Wheat from 50 to 100 bu/yr. + Reduced equipment and labor needed <ul style="list-style-type: none"> • at most, 3 trips with the equipment is needed + Reduced pesticide use <ul style="list-style-type: none"> • Discontinued and replaced atrazine from 4lbs/ac/yr to 0 • Saved approx. \$50 lbs/ac/yr 	<ul style="list-style-type: none"> - Reduction in crop yields at start of practice <ul style="list-style-type: none"> • 3-year lag to get yields back up to normal or above • \$ loss of income with low yields, especially in the first year - Social pressure at the start of the practice because no-till was not well received in 1988 - Increased cost for Grade Stabilization Structures and other practices - Machine Transition Costs to purchase and outfit no-till equipment <ul style="list-style-type: none"> • Purchase price + cost to modify a no-till planter is \$500 to \$600 a row • Started with 6 rows; now has 8 rows after modification • This was a minor negative for this farm. Machinery expenses may be higher depending on types of equipment selected.

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