

## Energy Enhancement Activity – ENR01- Fuel use reduction for field operations



### Enhancement Description

This enhancement is for fuel savings of 20% or more achieved by a reduction in field operations when compared to existing management system.

### Land Use Applicability

Cropland

### Benefits

In addition to saving money the advantages of fossil fuel conservation include reducing air pollutants such as greenhouse gas emissions, and decreasing our reliance on foreign oil.

### Criteria for Fuel Use Reduction for Field Operations

- Implementation of this enhancement requires that the participant reduce their field operations to achieve fuel savings of 20% or greater over their present baseline use.
- Reduced trips across the field, and reduced tillage intensity are documented by using RUSLE2 to compare the planned tillage operations with present baseline tillage operations.

### Documentation Requirements for Fuel Use Reduction for Field Operations

- The present baseline fuel consumption for all field operations is calculated using RUSLE2 at the time of sign-up. This baseline is compared with fuel consumption for the planned reduced field operations, also calculated with RUSLE2. The estimated reduction in fuel use between the present and the planned must be greater than or equal to 20%.
- Documentation of the fields where field operations have changed.

### References

- Crop Budgets - Nebraska Cooperative Extension EC04-872-S (Revised 2004)
- Energy Efficiency Programs in Agriculture: Design, Success, and Lessons Learned, Elizabeth Brown, R. Neal Elliot, and Steven Nadel, January 2005, Report Number IE051, American Council for an Energy-Efficient Economy.

## Michigan Supplement

### Enhancement Activity - ENR01 - Fuel Use Reduction for Field Operation

Producers requesting payment for this enhancement must attach the following documentation for all fields with the same Conservation Treatment Unit as required by their conservation plan. The Revised Universal Soil Loss Equation or RUSLE 2 model was used to make this record. Use the Fuel Use Report Print Option in RUSLE 2 to document the fuel saved by crop year or crop rotation as needed.

### RUSLE2 Profile Erosion Calculation Record

**Info:** [CSP 2011 ENR01-Fuel use before implementing conservation plan](#)

**File:** profiles\default  
**Access Group:** R2\_NRCS\_Fld\_Office

**Inputs:**

<i>Location</i>	<i>Soil</i>	<i>Slope length (horiz)</i>	<i>Avg. slope steepness, %</i>
Michigan\Berrien County	Berrien County, Michigan\25 LENAWEE SILTY CLAY LOAM\Lenawee silty clay loam 84%	100	1.0

<i>Management</i>	<i>Vegetation</i>	<i>Yield units</i>	<i>Yield (# of units)</i>
CMZ 04\a.Single Year/Single Crop Templates\ROW CROPS\Corn grain\corn grain;FP z4	Corn, grain	bushels	112.00

<i>Contouring</i>	<i>Strips/barriers</i>	<i>Diversion/terrace, sediment basin</i>	<i>Subsurface drainage</i>	<i>Adjust res. burial level</i>	<i>General yield level</i>	<i>Rock cover, %</i>
a. rows up-and-down hill	(none)	(none)	(none)	Normal res. burial	Set by user	0

**Outputs:**

<i>T value</i>	<i>Soil loss erod. portion</i>	<i>Detachment on slope</i>	<i>Soil loss for cons. plan</i>	<i>Sediment delivery</i>	<i>Net C factor</i>	<i>Net K factor</i>	<i>Crit. slope length</i>	<i>Surf. cover after planting, %</i>
5.0	1.2	1.2	1.2	1.2	0.23	0.26		6.5

Date	Operation	Vegetation	Surf. res. cov. after op, %
11/1/0	Plow, moldboard		3.4
4/21/1	disk, tandem light finishing		2.1
4/28/1	Cultivator, field 6-12 in sweeps		6.5
5/1/1	planter, double disk opnr	Corn, grain	6.5
10/20/1	Harvest, killing crop 50pct standing stubble		70

**FUEL USE EVALUATION: Before implementing Conservation Plan**

Fuel type for entire run	Equiv. diesel use for entire simulation	Energy use for entire simulation	Fuel cost for entire simulation, US\$/ac
(none)	6.0	830000	18

**SCI and STIR Output**

Soil conditioning index (SCI)	Avg. annual slope STIR	Wind & irrigation-induced erosion for SCI, t/ac/yr
0.3	113	0

The SCI is the Soil Conditioning Index rating. If the calculated index is a negative value, soil organic matter levels are predicted to decline under that production system. If the index is a positive value, soil organic matter levels are predicted to increase under that system.



**RUSLE2 Profile Erosion Calculation Record**

**Info: CSP 2011 ENR01- Fuel Use Reduction Calculation after Conservation Plan is Implemented.**

**File:** profiles\default

**Access Group:** R2\_NRCS\_Fld\_Office

**Inputs:**

Location	Soil	Slope length (horiz)	Avg. slope steepness, %
Michigan\Berrien County	Berrien County, Michigan\25 LENAWEE SILTY CLAY LOAM\Lenawee silty clay loam 84%	100	1.0

Management	Vegetation	Yield units	Yield (# of units)
CMZ 04\A.Single Year/Single Crop Templates\ROW CROPS\Corn grain\corn grain;NT z4	Corn, grain	bushels	112.00

Contouring	Strips/barriers	Diversion/terrace, sediment basin	Subsurface drainage	Adjust res. burial level	General yield level	Rock cover, %
a. rows up-and-down hill	(none)	(none)	(none)	Normal res. burial	Set by user	0

**Outputs:**

<i>T</i> value	<i>Soil loss erod.</i> <i>portion</i>	<i>Detachment</i> <i>on slope</i>	<i>Soil loss for</i> <i>cons.</i> <i>plan</i>	<i>Sediment</i> <i>delivery</i>	<i>Net C</i> <i>factor</i>	<i>Net K</i> <i>factor</i>	<i>Crit.</i> <i>slope</i> <i>length</i>	<i>Surf. cover</i> <i>after</i> <i>planting,</i> <i>%</i>
5.0	0.12	0.12	0.12	0.12	0.024	0.26		76

<i>Date</i>	<i>Operation</i>	<i>Vegetation</i>	<i>Surf. res. cov. after op, %</i>
5/1/0	Planter, double disk opnr w/fluted coulter	Corn, grain	76
10/20/0	Harvest, killing crop 50pct standing stubble		79

**FUEL USE EVALUATION .After adopting No till**

<i>Fuel type for</i> <i>entire run</i>	<i>Equiv. diesel use for</i> <i>entire simulation</i>	<i>Energy use for entire</i> <i>simulation</i>	<i>Fuel cost for entire</i> <i>simulation, US\$/ac</i>
(none)	2.5	340000	7.5

**SCI and STIR Output**

<i>Soil conditioning index</i> <i>(SCI)</i>	<i>Avg. annual slope</i> <i>STIR</i>	<i>Wind &amp; irrigation-induced erosion for SCI,</i> <i>t/ac/yr</i>
0.9	2.59	0

The **SCI** is the **Soil Conditioning Index** rating. If the calculated index is a negative value, soil organic matter levels are predicted to decline under that production system. If the index is a positive value, soil organic matter levels are predicted to increase under that system. The **STIR** value is the **Soil Tillage Intensity Rating**. It utilizes the speed, depth, surface disturbance percent and tillage type parameters to calculate a tillage intensity rating for the system used in growing a crop or a rotation. STIR ratings tend to show the differences in the degree of soil disturbance between systems. The kind, severity and number of ground disturbing passes are evaluated for the entire cropping rotation as shown in the management description.

**Fuel use reduction calculation: 6.0-2.5=3.5 gpa or 3.5 gpa fuel saved with conservation planned.**

For CStP fuel savings achieved by a reduction in field operations must be 20% or greater.