A farmer-friendly
Soil Organic Matter Calculator

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Corn Marketing Program of Michigan

Project Investigators

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Overview of OSU SOM Calculator Ver. 2.0

- Theoretical basis
- Interface
- Validity of the tool
- Downloading the tool
Precipitation, Temperature, Soil Texture, Location (natural factors)

- Crop Rotation
- Tillage
- Cover Crops
- Manure/Organic amendments
- Gypsum/Lime
- Drainage/Irrigation

Crop Rotation Management Scenarios

- Standard Crop Residue (PRE)

Native SOM

- Time interval

Predictable SOM

- Total SOM
- Active OM
- Passive OM
- C sink/source
- $ Revenue from Residue
- C Credits
- Nutrient status

*Time interval in years. Lucas Model is for long-term predictions.

Erosion

The Ohio State University
Soil Organic Matter Pools

1. NEW OM

2. OLD OM

2-Pool decay model for PRE (developed by Dr. Lucas)

```
y = 100e^{-0.466x}
R^2 = 0.9829
```
OSU SOM Calculator Ver. 2.0
### Data Entry Form – Page 1

**SIMULATION PERIOD**
- **Start Year**: 2015
- **End Year**: 2030
- **No. of Years**: 16

**CROP ROTATION**
- Crop: Corn
- Continuous for: 1 year
- Yield: 120 bu/ac
- Plant Residue Equivalent: 9240 lbs/ac

**Select Tillage**
- Tillage Type: Don't know
- Tillage depth: Optional

**Manure Application**
- Manure Type: NONE
- Application: 0 tons/ac

**Review your Crop Rotation**

<table>
<thead>
<tr>
<th>Rotation #</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Years</strong></td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td><strong>Crop</strong></td>
<td>Corn</td>
<td>Soybeans</td>
<td>D-NONE</td>
</tr>
<tr>
<td><strong>Yield (bu/ac)</strong></td>
<td>120</td>
<td>40</td>
<td>0</td>
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<tr>
<td><strong>PRE</strong></td>
<td>9240</td>
<td>5331</td>
<td>0</td>
</tr>
</tbody>
</table>
Data Entry Form – Page 3

**Scenario & Model Run**

- **Annual Residue Removal Rate**: 0 lbs/acre
  - After every 1 years

**Calculate**

**Review your Crop Rotation**

<table>
<thead>
<tr>
<th>Rotation #</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Years</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Crop</td>
<td>Corn</td>
<td>Soybeans</td>
<td>O-NONE</td>
</tr>
<tr>
<td>Yield (bu/ac)</td>
<td>120</td>
<td>35</td>
<td>0</td>
</tr>
<tr>
<td>FRE</td>
<td>9240</td>
<td>4665</td>
<td>0</td>
</tr>
</tbody>
</table>
Printable Report

1. Input Summary:
   - Crop Rotation: Corn, Soybeans, Oats, Corn, Oats, Oats, Oats, Oats, Oats, Oats
   - Sampling Depth: 8 inches
   - Cover Crops: None after every 1 year
   - Maturity Application: None (0 tons/acre)

2. SOM Status of soil:
   - SOM in 1990: 2.2%
   - SOM in 2029: 2.14%
   - SOM change: 0.30% in 39 years
   - Total Change in lbs of SOM (lbs/acre):
     - SOM in 1990: 0 lbs/acre
     - SOM in 2029: 0 lbs/acre

3. Residue Removal Scenario and Revenue:
   - Residue removed (lbs/year): 0
   - Price per ton removed (lbs/100): $0.01
   - Total Revenue (lbs): $0 in 29 years

4. Soil Nutrient Status:
   - Soil test for CH: 0.1%
   - Soil test for N: 1.3%
   - Soil test for P: 1.0%
   - Soil test for K: 0.2%

5. Atmospheric CO2 Impotratation:
   - 7.8 lbs of CO2 per acre per year
   - 3.7 tons of CO2 per acre in 38 years
   - Positive value indicates carbon sequestration.

6. Recommendations:
   1. To maintain the initial SOM levels you need to apply an average of 0.06 tons of bedded cow manure as an annual application.
   2. You can also select different manures, please refer to "OM Calculator" sheet and select a manure type in cell "MOM".
   3. A cover crop is an alternative/complement to the manure.
   4. Go to "OM Calculator" sheet and choose a cover crop in cell cell S55 to simulate its effect.

SOM Dynamics by Pools

- Passive Pool
- Active Pool
- Total SOM
Sensitivity of SOM Calculator

![Graph showing sensitivity of SOM Calculator with various scenarios over years 2010 to 2038.]

- **Base Scenario (C-S, Tillage)**
- **Base + Residue removal**
- **Base Scenario + Residue removal**
- **Base + Residue Removal + Erosion**
- **Base + Residue Removal + Cover crop**
- **Base + Residue Removal + Cover Crop + No Till**
Is the Calculator Accurate?

Morrow Plots - Continuous Corn (North-C)

1913-55

1.58 to 1.4 (in 35 years)

1955-90 (corn hybrids)

2.21 to 1.58 (in 42 years)
Performance evaluation

Data from 11 different experiments in Michigan and Illinois
Where to get it?

• The SOM calculator is available after due request. Please visit the following link for more details:

  • http://go.osu.edu/SOMCalculator
  • http://southcenters.osu.edu