**Crop response and changes in soil properties as affected by soil erosion, topsoil replacement, and application of anaerobically digested dairy manure solids in a Mollisol landform**

**Basic information**

The experiment was performed near Morris in west-central Minnesota (45.65°N, 95.83°W), U.S.A. The site was a ridge that was severely eroded due to landscape attributes and long-term cropping with intensive tillage. The study was initiated in 2006 and continued to 2016 in two phases. Details about Phase-1 experiments, treatment assignment, data collection, and related publications has been published in Ag Data Commons at <https://doi.org/10.15482/USDA.ADC/25206968.v1>. This publication reports data associated with Phase-2, which was conducted in 2011-2016. At the beginning of Phase-2, 40 mega gram per hectare of anaerobically digested dairy manure solids were applied to eroded plots and plots that had soil added in Phase-1. These experiments compared soil properties and crop response in plots with (a) eroded soil, (b) topsoil added in 2005, (c) manure solids added in 2011, and (d) soil (2005) plus manure solids (2011) added. Data reported in Phase-2 include crop stand, biomass, grain yield and quality, soil chemical properties, and weather information.

**Resources in this dataset:**

Resource Title: Metadata (This document)

File Name: Soil-Landscape Rehabilitation Phase-2 Metadata.docx

Description:

Meta information describing experimental design, location information, data collection procedure, and laboratory methods used to analyze plant and soil samples.

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| --- | --- |
| Field | Value |
| Keywords | Crop production  Crop productivity  Soil erosion  Tillage erosion  Water erosion  Soil health  Spatial variation  Soil restoration  Landscape restoration  Soil-landscape rehabilitation  Soil amendment  Digested solids from anaerobic digestion of dairy manure  Manure solids  Soil carbon  Plant nutrient  Soil profile  Soil fertility  Corn  Soybean |
| Spatial/geographical coverage area | Stevens County, Minnesota |
| Temporal coverage | Stevens County, Minnesota: Fall, 2011 to Fall 2016 |
| Publisher | U.S. Department of Agriculture |
| License | CC Zero |
| Contact Name | Schneider, Sharon |
| Contact Email | [sharon.schneider@usda.gov](mailto:sharon.schneider@usda.gov) |
| Public Access Level | Public |
| Program Code | 005:040 – National Research |
| Bureau Code | 005:18 – USDA - Agricultural Research Service (ARS) |
| Author | Sharon K. Schneider, Apurba K. Sutradhar, Thomas E. Schumacher, David A. Lobb |
| Peer Reviewed | No |
| Intended Use | These data provide field measurements of plant and soil at a geographical site as affected by (a) tillage and water erosion (b) replacement of translocated topsoil through soil-landscape rehabilitation, and (c) amending soil with solids from anaerobically digested dairy manure. The study site located in Stevens County, MN was a heavily eroded landform due to long term tillage and other environmental factors. The study was initiated in 2006 and continued to 2016 in two phases. In Phase-1, which was concluded in 2011, replacement of translocated topsoil on crop productivity and soil properties were evaluated. Phase-1 data associated with pre-restoration soil properties, digital elevation model, tillage and water erosion estimates, annual assessments of crop emergence, crop biomass, grain yield and quality, soil biological, chemical, and physical properties, weed communities, and weather information has been published in Ag Data Commons (https://doi.org/10.15482/USDA.ADC/25206968.v1). Phase-2 was conducted in 2011-2016. At the beginning of Phase-2, 40 mega gram per hectare of anaerobically digested dairy manure solids were applied to eroded plots and plots that had soil added in Phase-1. These treatments allowed comparisons of plots with eroded soil, topsoil added in 2005, manure solids added in 2011, and soil (2005) plus manure solids (2011) added. Data reported in Phase-2 include crop stand, biomass, grain yield and quality, soil chemical properties, and weather information. The data can be used to develop agronomic best management practices to improve crop production and to protect soil health. The data also could contribute to meta-analyses describing effects of erosion, soil-landscape rehabilitation, and amending soil with digested dairy manure solids on crop performance and changes in soil properties. |
| Use Limitations | Not all parameters were measured every year. |
| Funding Sources | Agricultural Research Service  USDA-ARS: 3645-11000-003-00D  USDA-ARS: 5447-12620-002-00D  USDA-ARS: 3080-12620-003-00D  USDA-ARS: 3080-12620-005-00D |
| Related Articles | None |
| ARIS Log Number | 425395 |
| ISO Topic(s) | Farming  Environment |
| State or Territory | Minnesota |
| Ag Data Commons Keywords | Crop production  Crop productivity  Soil erosion  Tillage erosion  Water erosion  Soil health  Spatial variation  Landscape restoration  Soil restoration  Soil-landscape rehabilitation  Soil amendment  Digested solids from anaerobic digestion of dairy manure  Manure solids  Soil carbon  Plant nutrient  Soil profile  Soil fertility  Corn  Soybean |
| ARS National Program Number | NP 212, Soil and Air |

Resource Title: Location weather information

File Name: Stevens County, Minnesota Weather Information Phase-2.xlsx

Description:

Daily temperature and precipitation data were collected from a nearby weather station and used to calculate growing degree days (GDD) in each growing season. The weather station data were also used to calculate long-term average temperature and precipitation.

This file contains links to the weather station data, time-period of data collection, units used to present temperature and precipitation, and how the GDD were calculated. Weather data were summarized daily.

Resource Title: Information of plant and soil monitoring

File Name: Stevens County, Minnesota Plant & Soil Data Phase-2.xlsx

Description:

Files contain plant and soil data collected from the research site. These data has not been published in peer-reviewed journals. A manuscript preparation is in progress and will be submitted to a peer-reviewed journal.