The Sustainable Corn Team

- USDA-NIFA funded "Climate and Corn-based Cropping Systems Coordinated Agricultural Project" (2011-2016)
- 140 scientists, staff, and students
- 9 states and 11 institutions†
- Transdisciplinary team spanning 19 disciplines from biophysical to social-economic

Team Goal

Identify adaptive and mitigative strategies for Midwest corn-based cropping systems to climate change. Emphasis is on understanding C, N, and water footprints of widely established and novel management practices that address sustainability and system resilience.

Research

- 35 agricultural research sites; see Fig. 1. Includes 55 treatments, 95 data variables, 100 management metadata.
- 5000 farmer survey
- 160 farmer interviews

Database

- Serves the needs of researchers for entering, editing, accessing, and exporting data sets.
- Emphasis placed on finding a solution that allows team to self-manage and is flexible for data types collected at different frequencies and for site variation.
- Development began in 2011 with functions released as built.
- Team centralized research database ("Climate and Cropping Systems Database") is accessible through internal team website (Fig. 2).
- Data management is handled using a combined model incorporating a traditional relational database and leveraging of the Cloud (Google). This approach mixes best technical approach while meeting needs of real users.

Technical Strengths

- Centralized identity management
- Data versioning and provenance (audit trail exists)
- Interactive editing of content via Wiki website
- Customized interfaces via scripts (Fig. 3)
- Data downloading, aggregation, and quality control via scripts
- Data formatting and standardization via interfaces

Data and Research Cycle Strengths

- Faster spin-up and accessibility of data to researchers
- Limited loss of data and supporting information
- Transparent data status via Data Dashboard (Fig. 4)
- Project work groups can discover data easily
- Improved transparency and reproducibility of findings
- Synthesis of data occurs during funded period of project and not post
- Increased outputs by team to funder (USDA-NIFA)

Paper out this month!