A Regional Matrix Tool for Cover Crop Selection and Guidance for Farmers in the Midwest

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ABSTRACT

Cover crops provide a variety of ecosystem services including erosion protection, soil building, nitrogen sourcing and scavenging, and weed, disease and pest management. The range of cover crop choices includes grasses, brassicas and legumes. While cereal rye dominates cover crop establishment, other cover crops are increasingly under consideration to provide specific environmental and agronomic services to cropping systems. Considerable plot- and field-scale research has been performed for numerous cash/cover crop combinations; however farmer access to performance and application information relevant to the Midwest region is limited. To provide farmers guidance for cover crop selection, a matrix tool was developed for the crop management zones of the Midwest region.

The matrix tool is patterned after the cover crop characteristics charts in the SAN/SARE book "Managing Cover Crops Profitably" detailing: 1) performance and roles, 2) cultural traits, 3) planting and 4) potential advantages and disadvantages. The information will be more detailed and specific for the Midwest region and sub regions including adding more cover crop choices, including varieties when known to be different, and considering additional roles or traits of cover crops.

The matrix tool will compile existing information and research results from the region, gleaned from experts in each state as well as published research and extension articles. The matrix tool will be made available in paper form and on the web in a form easy to use for farmers as well as NRCS and other conservation or farm advisors. The matrix tool is being developed through a collaborative effort of the Midwest Cover Crops Council that includes states Midwestern states and Ontario.

The development process will be described and example data presented.

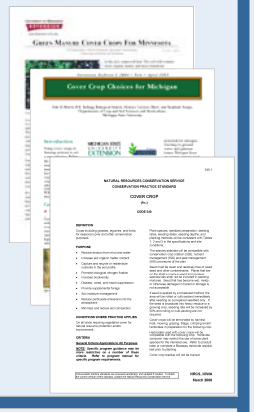
MCCC

The *Midwest Cover Crops Council* seeks to significantly increase the amount of continuous living cover on the Upper Midwestern agricultural landscape. From cities to the countryside, this transition in landscape design will produce numerous ecological benefits, including improvements in water, air and soil quality. As the public grows increasingly aware of our collective ecological footprint and its relationship to climate change and water quality, the effort to add living cover to our landscape can generate new sources of renewable energy, mitigate greenhouse gases, reduce the use of agricultural chemicals, and provide novel income streams for rural communities. In an era where the Mississippi River Basin and Great Lakes watershed suffer from serious environmental degradation, this shift in agricultural systems can play a significant and positive role in revitalizing and restoring our lakes, rivers, fields, and communities. To effectively achieve our aim of broad adoption of cover crops by farmers, we will build a vital and effective regional collaboration of agencies, individuals and the general public.

Photo taken by Tom Kaspar at Johanningmeier Dairy (IA)

PROBLEM STATEMENT

- Widespread cover crop adoption and usage by farmers has been hampered in the Great Lakes and Upper Mississippi River basins in part due to the lack of:
  - Knowledge of cover crop alternatives
  - Understanding of cover crop agronomic and environmental functions
  - Insight into economic and agronomic risks
  - Accessibility to specific cover crop application information
- Considerable local information has been generated by universities, agricultural organizations and farmers throughout the region on cover crop performance and application, however this information:
  - Resides within multiple organizations and systems
  - Varies in form and format
  - Is often difficult to locate
  - Does not lend itself to making cover crop decisions
- A system is required which:
  - Consolidates local information within the region
  - Provides a common format
  - Implements a regional database
  - Supports farmer cover crop decision-making



BACKGROUND

- Since its inaugural summit in 2006, the MCCC has been committed to developing a tool to support cover crop decision-making, termed the **Regional Matrix Tool**, reflecting the grid or matrix structure of the information.
- Andy Clark, Coordinator, SARE Outreach authored an excellent handbook entitled *Managing Cover Crops Profitably* which details cover crops and their application broadly at the national scale.
- This reference was chosen as the basis for the information and data structure for a regional system.

Sustainable Agriculture Research and Education (SARE)

CONCEPT

- Local cover crop knowledge and application information from throughout the Great Lakes and Upper Mississippi River basins can be consolidated into a centralized database.
- This information will add regional specificity and applicability over *Managing Cover Crops Profitably* .
- A web-based tool can be developed to assist farmer cover crop decision-making using the information from this database.

PROCESS

REGIONAL COLLABORATION

- At the 3rd Annual Midwest Cover Crops Council Workshop/Meeting regional cover crop representatives and experts were engaged providing input on:
  - Design of the Regional Matrix Tool
  - Regional cover crop species for inclusion in the Tool (50 species)
  - Information and parameters to be included in the Tool (70 categories)
- Participants, working in groups, reviewed and modified posters consolidating the information represented in the charts from *Managing Cover Crops Profitably.*
- Participants recommended cover crop experts to be involved in the Regional Matrix Tool development as:
  - Contributors
  - Reviewers
- A subcommittee was formed to further refine the input and finalize the matrix design.

LOCAL COLLABORATION

- Meetings will be held with stakeholders from each state/province within the region to:
  - Review the subcommittee matrix final design recommendation
  - Identify cover crop information sources
  - Identify cover crop information contributors
  - Identify a local team to participate in the development of the Regional Matrix Tool
- The local teams will be responsible for reviewing and validating local information and recommendations for cover crop application within their state/province.

TOOL DEVELOPMENT

- A web-based tool will be developed to assist farmers in identifying species and production systems appropriate for their locations that:
  - Meet their goals for using a cover crop
  - Are appropriate within their crop rotation systems
  - Minimize or identify the agronomic and economic risks associated with their use

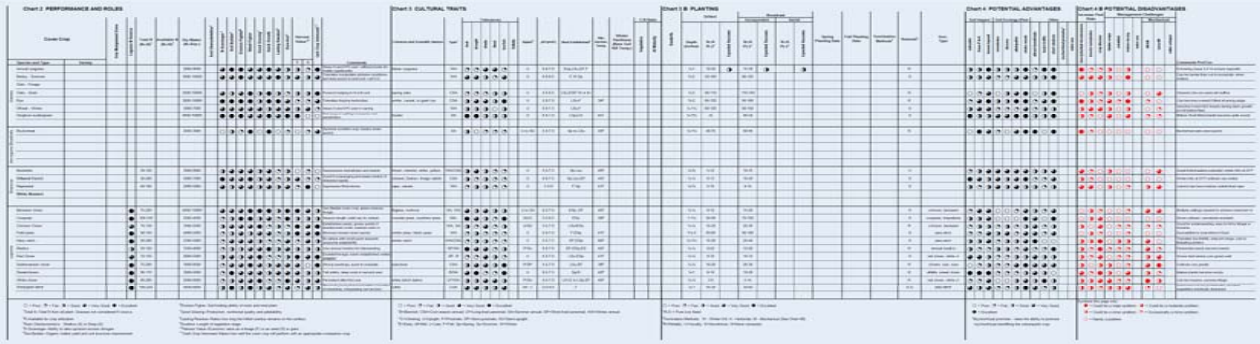
WEB RESOURCES

- The MCCC developed and implemented a website for regional cover crop information www.mccc.msu.edu
- The MCCC website is a vehicle for:
  - Disseminating regional cover crop information
  - Soliciting cover crop information
  - Accessing the Regional Matrix Tool

REGION

- Great Lakes and Upper Mississippi River basins represented by the MCCC
  - Illinois
  - Indiana
  - Iowa
  - Michigan
  - Minnesota
  - North Dakota
  - Ohio
  - Ontario
  - Wisconsin

DATA EXAMPLE



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