Empowering Farmers with Real-Time Data

Information on soil moisture and temperature dictates planting schedules and crop development

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The U.S. Environmental Protection Agency (EPA) awarded Sand County Foundation a grant to empower farmers with real-time data about their soil and conservation practices.

This project provides 30 participating growers from Wisconsin and Minnesota with on-farm data of how farm management influences soil trafficability and temperature, nutrient runoff potential and other factors.

The project, titled "Show Me the Data! Empowering Conservation Champions with Innovative Real-Time Soil Metrics," was awarded $997,383 from the EPA.

The three-year, on-farm initiative involves remote sensing and soil sensors and is one of 12 projects the EPA selected to receive "Farmer to Farmer" grant funding totaling nearly $11 million.

The resulting data will aid farmers in making in-season management decisions based on real-time soil moisture and temperature data.

Soil moisture and temperature are key drivers of agricultural production systems. These factors dictate planting schedules, crop development and the timing of field operations.

"Farmers are seeking real-time data to guide in-season decision making," says Dr. Heidi Peterson, Sand County Foundation's vice president of Agricultural Conservation and Research.

MANAGEMENT DECISIONS

She noted that often farmers are forced to rely on anecdotal

Above: Minnesota potato and vegetable farmer, Jocelyn Schlichting (left), poses with the Farmers Edge field crew and Sand County Foundation's Dr. Heidi Peterson (right) following the installation of the project's first field sensor in July 2021.

observations of how their management decisions are affecting a field's soil moisture and temperature.

"To meet this need, we teamed up with Farmers Edge and the University of Minnesota to develop this demonstration," Dr. Peterson explains.

"Sensor technology installed by Farmers Edge allows our participants to compare field data and understand how farm management influences soil properties critical to climate resiliency and nutrient transport," she notes.

Soil probes were installed across Minnesota and Wisconsin on 15 sets of paired fields. Each pair has soils with similar texture and land position.

Sites with varying management principles were chosen to quantify procedural influence on infiltration, water holding capacity, soil trafficability, leaching potential, aggregate stability and other soil properties critical to improving resiliency and reducing nutrient transport.

In addition to annual soil health and routine sample collection, a Farmers Edge technology subscription to in-field, soil temperature and moisture probe data was employed at each location to provide real-time data for the collaborating farmers.

CLIMATE PREDICTIONS

Under current climate prediction models, soils in the Midwest are expected to be exposed to extended, intermittent flash-drought conditions, as well as periods of more intense rainfall and flooding.

In addition to the farm management obstacles magnified by these changes, water quality problems can be exacerbated by increased frequency of such high-intensity events.

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"EPA is proud to support the leadership of farmers and their innovative approaches to improve water quality while working to fuel and feed the world."

– Michael S. Regan
EPA Administrator

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The EPA's "Farmer to Farmer" grants support the leadership of farmers in improving water quality, habitat and habitat resilience, and in peer-to-peer information exchange to benefit community and ecosystems in the Gulf of Mexico Watershed.

Farmers manage millions of acres of privately held working lands within the Gulf of Mexico Watershed.

Conservation management can minimize pollution, specifically the excess nitrogen and phosphorus that can enter waterbodies through runoff or soil erosion.

"EPA is proud to support the leadership of farmers and their innovative approaches to improve water quality while working to fuel and feed the world," says EPA Administrator Michael S. Regan.

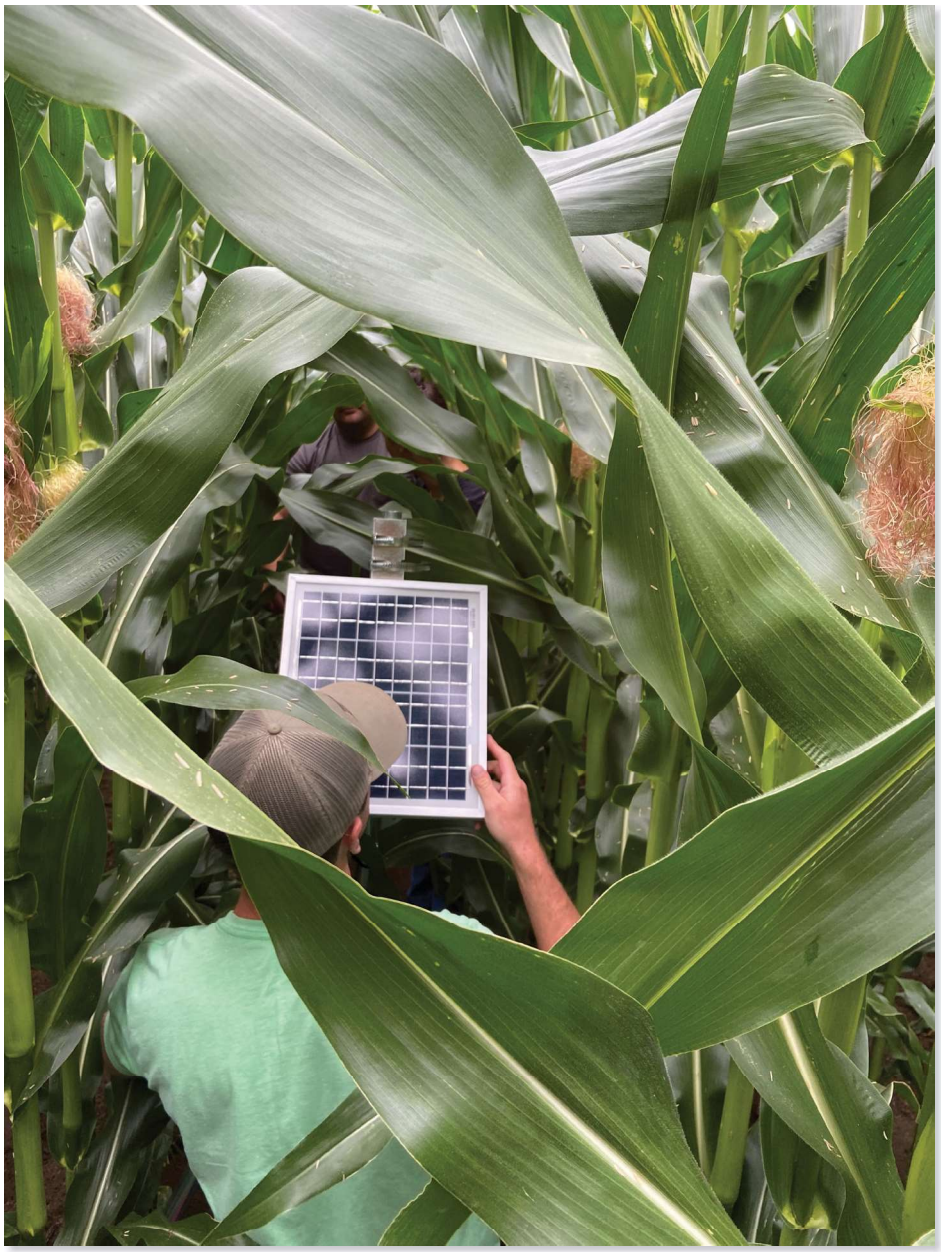
"EPA is committed to meaningful partnerships with farmers to advance sustainable agriculture practices while creating healthy, clean and safe environments for all," Regan adds.

KEY PARTNERS

In addition to the farmer collaborators, Farmers Edge and the University of Minnesota, other key partners in the project include the Minnesota Department of Agriculture, Minnesota Soil Health Coalition and Benton Soil & Water Conservation District.

Further project partner involvement comes from the Mower Soil and Water Conservation District, Soil Solutions Consulting LLC, Watershed Protection Committee of Racine County and Dodge County Farmers for Healthy Soil & Healthy Water.

The Farmer to Farmer grant funding is available to develop innovative practices within farming communities, measure the results of those practice, and identify how the practices will be incorporated into farming operations.



The solar-powered probes have sensors that record soil moisture and temperature at six depths down to 40 inches, and then transmit data that is accessible in real time to the farmers. Two probes were placed in each of the 30 fields across Wisconsin and Minnesota.

Under this grant program, proposal winners will carry out project activities using one or more of the following methods: surveys, studies, research, investigation, experimentation, education, training and/or demonstrations.

The Gulf of Mexico Division is a non-regulatory program of EPA founded to facilitate collaborative actions to protect, maintain and restore the health and productivity of the Gulf of Mexico in ways consistent with the economic well-being of the region.

To carry out its mission, the Gulf of Mexico Division continues to maintain and expand partnerships with state

and federal agencies, federally recognized tribes, local governments and authorities, academia, regional businesses and industry, agricultural and environmental organizations, and individual citizens and communities.

For more information, visit https://www.epa.gov/gulfofmexico.

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University of Minnesota Graduate Student Madeline Vogel (left) and Sand County Foundation Agricultural Conservation Specialist Parker Witt (right) collect soil infiltration data following corn harvest on a field owned by Minnesota potato and vegetable grower, Jocelyn Schlichting.