USDA United States Department of Agriculture

Natural Resources Conservation Service

Soil and Plant Science Division

Soil Survey Region 10

MLRA Soil Survey Office, Albert Lea, Minnesota

Local Soil Health Team Benefits from Soil Survey Assistance

Purpose

There is a growing interest in southern Minnesota and northern Iowa for farm practices that promote better soil health and water quality. Major Land Resource Area (MLRA) soil scientists work with local soil health teams. The teams teach farmers how farming methods affect the ability of soils to function. The teams focus on soil properties, such as aggregate stability, bulk density, and infiltration rates.

Background Information

MLRA 103, which is in south-central Minnesota and north-central Iowa, has a footprint of 63 counties. This low-relief area is dominated by medium textured soils; receives 23–35 inches of rain annually; has a growing season that is long, warm, and humid; and has soils that have a thick, black surface horizon. These factors make it nearly ideal for corn and soybean production, and about 80% of the land area is used for these crops. The use of intensive tillage and large amounts of nitrogen have given rise to widespread water-quality issues. Because of these issues—and the inability of grassed waterways and buffers to sufficiently improve water quality—there is a growing interest in whole-farm practices that promote better soil health and thereby achieve better water quality.

The Freeborn Area Soil Health Team was formed in 2013. It is a diverse group of local farmers, agency staff, and agricultural business professionals. Each year, the team strives to educate the local farm community on how to successfully transition from conventional farming practices to a system of reduced tillage plus cover cropping—without risking their entire farm operation. The team hosts multiple field days, workshops, and shop talks to promote the benefits that reduced tillage and cover crops have on water quality. The role of the MLRA staff has been to educate farmers and others during team meetings and presentations to local farmers. The MLRA staff teaches about those technical aspects of soil that relate to soil health and farming practices. The staff uses field demonstrations, such as the slake test, aggregate stability test, and rainfall simulator, to show farmers how soil management can influence water quality for their surrounding communities (fig. 1).

Figure 1.—Soil slake test demonstration by MLRA 103 Soil Scientist Myles Elsen.

Key Outcomes/Products

College educated agronomists and farmers don't always understand soil as a living system that needs to be maintained; instead, they treat it as a medium in which to grow things. Farmers are starting to realize that by concentrating on only the

chemical part of the soil system equation (Physical + Biological + Chemical = Soil System), that their fields are not functioning at optimal levels. Farmers are increasingly interested in understanding their soil as a living system because they see neighbors improving their soil and read about it in every farm magazine.

Through public events, the soil health team has helped farmers understand how to change their farm management practices to improve soil health (fig. 2). These events have contributed to the successes of the Soil and Water Conservation District (SWCD) and Natural Resources Conservation Service (NRCS) in Freeborn County. Farmers planted nearly 7,000 acres of cover crops just this past year, up from only 600 acres in 2013 when the team began.

Figure 2.—Freeborn Area Soil Health Team's 2019 winter soil health event brought in 115 attendees.

Future Goals/Conclusions

It has become widely known by soil scientists and soil engineers that soil properties can vary greatly because of land management. Despite the wide distribution of this knowledge, there is still a need to document dynamic soil property data for different land management practices. The information is needed so that modelers, engineers, and other land-use managers can accurately depict and predict hydrologic patterns. Documentation would also improve the technical assistance that conservation planners and engineers provide and would let educators speak with hard data about how each land management decision influences the soil's ability to function properly.