

Focusing on Field-Size Watersheds

A soil and water management model tailored to small farms is the goal of a 6-year study by U.S. Department of Agriculture scientists.

Scientists with USDA's Agricultural Research Service in Ames, Iowa, will focus on four small watersheds located near Treynor, Iowa. There, the soil contains primarily wind-deposited silt particles, and the land is strongly sloping—a combination that makes the area erosion-prone.

In a watershed, rainfall not absorbed into the soil flows to a naturally occurring, common drainage point. A watershed can range from a few dozen to hundreds of thousands of acres.

"The Treynor project focuses on field-size watersheds and will be a model for the future," says Douglas L. Karlen, a soil scientist at the ARS National Soil Tilth Laboratory at Ames.

"In the past, conservation was directed at individual farmers and their farms. By focusing on the role of watersheds in soil and water management, individual farmers can have a bigger impact on the environment beyond the farm fence."

Karlen says scientists have three goals for the Treynor project: improve water quality, improve soil productivity, and help farmers maintain profitable farms.

Agency researchers are using the Treynor model because they've kept records of the soil erosion losses there for 30 years. Many farmers in that area planted corn year after year.

"In general, each corn crop removed 52 percent of all nitrogen fertilizer applied to the watershed each year," says Karlen. That meant farmers had to reapply nitrogen annually. That's expensive for farmers, and it's not healthy for the soil or the groundwater."

To improve soil and water management in the watershed, scientists are evaluating sustainable agricultural practices—those in which farmers use a variety of crops, soil cultivation techniques, and planting strategies to control weeds and insects, reduce chemical use, and lessen the amount of soil eroded from the land.

Sustainable agriculture is already helping one farmer in the watershed. Robert Dietzler of Silver City, Iowa, has started planting corn one year and soybeans the next. By planting alternating crops of soybeans, he adds nitrogen to the soil, so he doesn't need to apply as much nitrogen fertilizer to the next year's corn crop. He's also stopped tilling his land each year, so there is more crop residue on the soil surface; this cuts erosion.

"My corn yields were much better than the year before—5 to 10 bushels higher," Dietzler says. "I also see that less soil is coming down off the hill."

That's good news for the future and could mean that farms will be managed with an eye toward the "big picture," Karlen says.

"As farms have gotten larger, farmers' awareness of their impact on the environment has expanded. The Treynor project integrates everything—soil, water, farming practices, economics, and environmental impact," says Karlen. "If we start thinking about whole-watershed management, then farmers can have a greater impact on the environment."—By **Dawn Lyons-Johnson, ARS.**

Douglas L. Karlen is at the USDA-ARS National Soil Tilth Laboratory, 2150 Pammel Dr., Ames, IA 50011; phone (515) 294-3336, fax (515) 294-8125, e-mail karlen@nsl.gov ♦

KEITH WELLER (K7840-13)



In a small watershed near Treynor, Iowa, horticulturist Mike Burkart (left) and farmer Bill Vorthman draw water from a 30-foot-deep sampling well to test for herbicides and nitrate.