

Erosion estimated to cost Iowa \$1 billion in yield



Iowa State University agronomy professor Rick Cruse talks about a study he is participating in to evaluate the amount of soil eroding from Iowa farm fields and determine its associated economic impact. Charlie Litchfield/The Register



Donnelle Eller, deller@dmreg.com 10:58 p.m. CDT May 3, 2014



(Photo: Stan Buman/Special to the Register)

Wind and rainstorms like those that pummeled most of Iowa last week help carry tons of rich, fertile topsoil from its farmland each year — and potentially cut \$1 billion in yield from the state's 88,000 farms, says an Iowa State University agronomy professor.

Rick Cruse is working to find a better way to measure erosion and its financial impact, building on a report released three years ago that sounded an alarm on the severity of Iowa's soil erosion. It says parts of Iowa are losing up to 12 times more soil than the government estimates.

Iowa's rich topsoil provides the foundation for the state's farming industry — businesses that range from corn and soybean growers to ag equipment and seed manufacturing giants like Deere & Co. and DuPont Pioneer.

Agriculture and related businesses provide about one-quarter of Iowa's \$152.4 billion gross domestic product.

The new model Cruse and his teams are developing is expected to paint an even grimmer picture of Iowa's soil erosion. More exact data could bolster arguments to expand federal conservation programs that pay for removing highly erodible land from production or for taking prevention steps like building grass buffer strips along streams.

"With the new model, we're likely to have a more disturbing picture of how badly damaged some of the most vulnerable fields are," said Craig Cox, a senior vice president at the Environmental Working Group, which released the 2011 report. It was based on data from ISU's Iowa Daily Erosion Project, which Cruse leads.

It showed some of the most severe erosion is occurring in the western and southeastern parts of the state.

"There's no reason to believe things have gotten dramatically better in the past few years, in terms of how well cared for Iowa's soil and water is," said Cox, who points to fewer environmentally sensitive acres set aside in federal conservation programs. He blames the reduction — 445,474 acres from 2007 to 2013 — on farmers chasing higher corn and soybean prices.

Q&A: [Measuring erosion became his mission \(/story/money/agriculture/2014/04/29/rick-cruse-measuring-erosion/8491841/\)](/story/money/agriculture/2014/04/29/rick-cruse-measuring-erosion/8491841/)

STATISTICS: [Soil erosion in Iowa \(http://archive.desmoinesregister.com/assets/jpg/m0504soilerosionWEB.jpg\)](http://archive.desmoinesregister.com/assets/jpg/m0504soilerosionWEB.jpg)

But Bill Northey, Iowa's secretary of agriculture, said fewer Iowa farmers are using conservation programs because the programs themselves have been scaled back.

The 2008 farm bill lowered the cap on the federal Conservation Reserve Program, referred to as CRP, dropping it by 7.2 million acres. Those acres must be set aside and protected by soil-holding grasses and trees. The new farm bill, signed this year, will continue to scale down the cap through 2018. In addition to federal conservation programs, the state provides cost-share funding.

"Erosion is a decades-old problem," Northey said. "We're trying to figure out solutions that are right, individually as well as collectively."

Erosion taking soil's 'cream of the crop'

The Environmental Working Group's report estimated that 10 million acres of Iowa farmland saw more erosion than is naturally replaced, based on 2007 data. An additional 6 million acres lost soil at twice the sustainable rate. That's about two-thirds of the nearly 24 million acres farmers expect to plant to corn and soybeans this year.

"We're losing soil that's highest in organic matter, highest in nutrients," Cruse said. "We are losing the cream of the crop."

Lost topsoil typically means lower yields — and less money to farmers and the state's economy. Cruse's team will work to nail down the economic impact from soil erosion.

His \$1 billion annual estimate excludes expenses such as flood damage that can occur with the loss of moisture-holding soil or additional costs for purifying drinking water.

"That number is going to be large," said Cruse, who expects to release his economic impact study within the next two years.

If the \$1 billion figure is accurate, Northey said, it would have added 5 percent to Iowa's \$20 billion in crop production last year.

Northey said spring rains last year — and the erosion that came with them — "were an attention getter." Iowa hadn't seen that much rain — a total of 17.7 inches in March, April and May, nearly 7½ inches above normal — in more than 140 years of record keeping. It resulted in nearly 730,000 acres not getting planted.

"We saw more erosion than farmers were happy with," Northey said.

It prompted more farmers to try cover crops, a conservation method that helps keep soil in place. Farmers were able to tap \$2.8 million in state cost-share money to try the over-winter crops like cereal rye. And an estimated 300,000 acres were planted to cover crops last year.

"People are working hard to improve," Northey said. "I think that needs to be appreciated. But we need to do more. ... Erosion control has to happen on 23 million acres."

System to measure economic impact

The model Cruse will bring online this summer will use a new satellite system to track — by farm — the type of soil, a field's slope, crop rotation, type of tillage and conservation efforts, among other factors. That information will be combined with another satellite system providing precipitation data.

Later, the erosion estimates will be combined with soil depth measurements that Cruse's team is taking at nearly a dozen farms across the state and matched up with several years of crop yield data. That, Cruse said, will help the teams determine the economic impact.

Imagine, Cruse said, that the government's average for soil erosion — 5.4 tons of soil per year — equals soil loss about the thickness of a dime. That could mean just a fraction of a bushel lost, until it's coupled with multiple years of losses statewide. Then "the importance of its economic impact becomes real," he said.

"Farmers know that losing topsoil has a negative impact on yield," Cruse said. "But when the majority of our land is rented, and many of these farmers don't know if they'll have it more than one year, a fraction of a bushel this year may not really outweigh my need to farm every inch of that land."

Putting an estimate on the economic impact could help farmers and landowners take a longer-term view of soil erosion, Cruse said.

Rick Robinson, an environmental adviser at Iowa Farm Bureau, said a more sophisticated erosion model will help focus work and money in areas that most need it.

"Time after time, we see more watershed project funds applied for than are available," Robinson said. "With the limited money that we have available to do this work, it's important that we prioritize the watersheds, areas and fields that are of most concern."

Last year, for example, Iowa groups seeking watershed improvements sought about \$100 million more in state and federal funding than was available, he said.

Farmer Jeff Pape is part of the Hewitt watershed improvement project near Dyersville in eastern Iowa. About 60 farmers have worked together for eight years on erosion prevention and nutrient reduction. That includes adding grass waterways, building terracing and buffer strips, and no-till and strip-till farming. No tillage leaves all plant stalks, leaves and other residue to feed soil nutrients. Strip till means limited tillage on the seed bed.

Pape said he's been no-till farming for about 15 years and can see the difference it makes in holding water and improving soil nutrients.

"I think we do have some issues in the state," Pape said. "But I think we're having a huge impact on soil erosion in our part of state ... and I think it will grow. But it's not something that happens overnight."

How fast is soil replenished?

The federal government estimates Iowa soil is replaced at about 5 tons per acre per year, which is slightly less than the 5.4-ton rate the state loses soil, based on the National Resources Inventory for 2010, the most recent available.

But studies have found that soil is being replaced much less robustly than the government estimates — less than a half ton per acre per year, said Rick Cruse, an Iowa State University agronomy professor.

If that half-ton annual replacement figure is right, he said. "Even in a best-case scenario, and we were limiting erosion at 5 tons per acre per year ... we're losing soil at a rate that's much greater than soil formation."

'Ephemeral gullies' not included

Neither the new nor the old erosion models will include ephemeral gullies. Those are deep washes that spring up in fields across the state and that can sweep away Iowa's richest, most productive soil.

Rick Cruse of Iowa State University estimates that these gullies cause 20 percent to 90 percent of total erosion in Iowa, a factor he thinks "is being ignored."

Cruse and Agren, a Carroll-based company that helps farmers measure field erosion, are working on an ephemeral gully erosion model, or calculator. Agren's Tom Buman said it will take a few years to fully test a prototype that's been developed.

Read or Share this story: <http://www.desmoinesregister.com/story/money/agriculture/2014/05/03/erosion-estimated-cost-iowa-billion-yield/8682651/>