

# IOWA STATE UNIVERSITY

Iowa Agriculture and Home Economics  
Experiment Station

## **Corn Suitability Rating (CSR) Background and Update**

May 2013

### **What is the Corn Suitability Rating?**

The Corn Suitability Rating (CSR) is an index that rates soil types for their potential row-crop productivity. Early concepts for rating productivity date back to the 1940s by Iowa State University (ISU) scientists. A major advance came in 1971 with an ISU publication describing CSR by Thomas Fenton, professor of agronomy at Iowa State, and several colleagues. CSRs are based on inherent soil properties 60 to 80 inches deep, average weather and the potential of different kinds of soil for row-crop production. The CSR reflected the scientists' extensive expert knowledge of these factors, modern statistical methods and a multiyear, detailed analysis of the productivity of Iowa's 30 million acres of farmland. CSRs have been — and arguably remain — the most sophisticated and complete quantitative soil productivity ratings available in the world. As a resource, they certainly have been the most trusted.

### **Do CSRs have ties to Iowa legislation?**

The CSR was originally established in response to county assessors who needed a measure to assess the productivity of farmland. In the late 1960's the State of Iowa codified soil productivity as part of farmland assessment. And in 1977 the legislature required farmland be entirely assessed on the basis of productivity and net earning capacity. The legislation mandates the use of modern soil surveys for equalization of agricultural land within each county. (Code of Iowa, Section 441.21, 1e and 1f). All other ways that CSRs have been used by the public, including predicting yields, cash rents and land-sale values, are byproducts of this original intent and a mark of the quality of the science that created it.

### **What has changed since the CSR was introduced in the early 1970s?**

Since 1971, from a technical point of view, the knowledge base of soil properties has been significantly enhanced and expanded. The science for calculating CSRs has changed and become more robust. The current system for soil classification was not in place 40 years ago. Today, more than 500 soil series are recognized in Iowa, 150 more than when the CSR was first published. Another example is the percentage of different soil series within a specific soil map unit. That percentage can now be recognized and recorded, which was not the case in earlier years.

### **Is Iowa State planning to change the CSR?**

Iowa State is releasing a new method to determine CSR values for Iowa soils. This effort, called "CSR2," generally provides an index comparable with the original CSR but with greater transparency, consistency and method of calculation. A key feature would be to provide a system so that any interested person — a county assessor, farmer, realtor or other — readily and clearly understands the factors that underlie the index. The factors used in calculating CSR2 are:

- Inherent soil properties;
- specific field conditions captured by each soil map unit;
- soil depth and erosion resilience (60 to 80 inches);
- and expert judgment.

**What does “expert judgment” mean?**

Expert judgment reflects the fact that soil productivity is a complex property that extends beyond readily observable soil properties, site conditions and local climate. As in the preceding decades of CSR, Iowa State scientists need to ensure that the best scientific knowledge in soils and agronomy is applied in determining meaningful CSR values. Expert judgment factors will be decided by mutual agreement of local USDA Natural Resources Conservation Service (NRCS) soil scientists and the Iowa State University Experiment Station representative to the Iowa Cooperative Soil Survey.

**What other key features are involved with CSR2?**

Another key feature is the use of simple weighted average values for each soil map unit in Iowa. There are more than 10,000 soil map units in Iowa, and they are more complex than many users of soil surveys realize. A typical soil map unit routinely contains a dominant soil series and one or two minor soil series. The weighted average will use soil map unit data collected by NRCS Soil Survey personnel as soil maps are updated. Because today’s official soil surveys are web-based documents maintained by the National Cooperative Soil Survey, another CSR2 goal would be to ensure updates are timely and made available in an online knowledge resource, when new soil series or new classifications are created or changed across Iowa.

**What is the expected impact of CSR2?**

The expected impact of converting to CSR2 will be small, especially in eastern Iowa. There will be an increase in CSR2 values in parts of north-central, west-central, western and northwest Iowa. The increase occurred because CSR2 considers climate to be a non-limiting factor across the entire state whereas CSR considered climate to be progressively more limiting to the north and west across Iowa. However, this adjustment applies to all soils, so the increase will be relative and uniform. To write this another way, it is now possible for a soil in, say, Sioux County to have a CSR2 value of 100.

As with CSR, it uses the best soil science possible to evaluate land productivity. What’s particularly advantageous is that CSR2 has CSR as a reference point and an historic link. This allows CSR2 to be measured relative to an outstanding, universally trusted reference for equitable farmland assessment. As is appropriate, CSR2 is generally proportional to the currently used CSR values except for those areas where the rainfall correction factor has been deleted. There remain, though, a few percent of Iowa’s soil map units where CSR2 values differ from CSR by 15 or more points. This is mainly due to the complexity of some soils, especially a soil map unit containing unique properties or multiple inclusions of different kinds of soil. For these soils, close alignment will depend on the expert judgment factor.

**What comes next for CSR2?**

On July 1, 2013, CSR2 and CSR values will be released side-by-side as part of the update to ISU’s Iowa Soil Properties and Interpretations (ISPAID) database. It will be available on the Iowa State University Extension & Outreach Soil and Land Use webpage (<http://www.extension.iastate.edu/soils/ispaid>).

Beginning October 1, 2013, CSR2 will become available through the USDA-NRCS Web Soil Survey (<http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm>). Web Soil Survey is the nation’s official source of soil survey information. It is the source used by the federal government for soil maps and the data and interpretations associated with soil maps.

**When will CSR2 begin to be used in land valuation by assessors to aid in equitable farmland assessments?**

The soonest it will be used by county assessors is 2015.

**How will CSR2 be used by county assessors to aid in valuation of agricultural land?**

CSR2 will be used the same way CSR is used now, along with soil maps, to equalize tax assessments on agricultural land. The Code of Iowa requires that farmland assessments be based on productivity and net earning capacity. County assessors use CSR as the measure for determining productivity of each parcel of land within the county where the tract is located and spreading the valuation across all parcels.

The formula starts with the average productivity value per acre in each county as set by the Iowa Department of Revenue. That value is taken times the total taxable acres of farmland in the county. The total taxable farmland value for each county is divided by the total CSR points for that county to determine the value of each CSR point.

The value of each CSR point is then multiplied by the average CSR for individual tracts of farmland to equalize the value per acre based on inherent productivity. Here is an example from ISU Extension publication "Corn Suitability Ratings — An Index to Soil Productivity, PM-1168 (<https://store.extension.iastate.edu/ItemDetail.aspx?ProductID=4505>), which can be downloaded for no charge.

**Table 5. Worksheet used by Iowa county assessors for equalization of assessed value of farmland based on inherent soil productivity.**

1. Average value of an acre of farmland.			(1) <u>\$1,500.00</u>
2. Total taxable acres of farmland in county.			(2) <u>340,000</u>
3. Total value of taxable farmland.	<u>\$1,500</u>	X	<u>340,000</u>
		=	(3) <u>\$510,000,000</u>
4. Total CSR points in county.			(4) <u>23,800,000</u>
5. Value of each CSR point:	(3) <u>\$510,000,000</u>		= (5) <u>\$21.43</u>
	(4) <u>23,800,000</u>		
6. Average CSR for example land tract.			(6) <u>75.2</u>
7. Equalization per acre based on inherent productivity.	<u>\$21.43</u>	X	<u>75.2</u>
		=	(7) <u>\$1,611.54</u>
8. Equalization value of tract.	<u>80.0</u> Acres	X	<u>\$1,611.54</u>
		=	(8) <u>\$128,932.20</u>

**Will my property taxes on agricultural land go up because of CSR2?**

They may go up or they may go down. If the taxes change, it will be primarily because of the net earning capacity, which is part of the average productivity value, not because of CSR2. The increases in corn and soybean prices in recent years will be the driver on increases in land values .

**Will CSR2 change the current CSR for my farmland?**

Noticeable increases in CSR2 will occur for farmland in parts of north central, west central, western and northwest Iowa. Due to annual rainfall increases in these areas of the state the rainfall adjustment factor is dropped from CSR2. However, this applies to all soils, so the increase will be relative and uniform. This will not affect how CSR is used to equalize assessment of agricultural land.