

TECHNICAL NOTES

U.S. DEPARTMENT OF AGRICULTURE STATE OF COLORADO NATURAL RESOURCES CONSERVATION SERVICE

Economics Technical Note No. 1

May 23, 2013

To: All Offices

From: Aaron Waller – State Economist

Subject: How do you value soil?

In many ways the value of soil defies “calculation”. Healthy soil has many interrelated benefits to the water, air, plants, animals and humans in the ecosystem. These are very difficult to fully quantify. However, it can be illustrative to consider a partial value of healthy soil to the farm or ranch business. Here is an example:

Nutrient Value of Organic Matter

An acre furrow slice (top 6”) of soil with 1% soil organic matter would equal 10 tons of organic matter. Organic matter is usually about 50% carbon and 5% Nitrogen with lesser amounts of the other key nutrients. Considering these basic proportions in soil organic matter, a baseline nutrient value could be calculated:

Organic Matter (1%) in an acre furrow slice. ¹			
1%	lbs	\$/#	Value
Total	20000		
N	1000	\$0.65	\$650.00
P	100	\$0.67	\$67.00
K	100	\$0.55	\$55.00
S	100	\$0.50	\$50.00
C	10000	\$0.001	\$10.00
			\$832.00

“.... soil conservation is not just an incidental bit of the mechanics of farming; it becomes part and parcel of the whole business of making a living from the land...” - H.H. Bennett. 1928. [Soil Erosion A National Menace](#). USDA Circ. #33.

- Every 0.1% percent of soil organic matter has a nutrient value of \$83/ac.
- If it takes about 4 tons of crop residue to build that 0.1 % or 1 ton of soil organic matter, then crop residue is worth at least \$20/ton in nutrient value alone. This value is consistent with the NPK value of baled corn stover calculated by analyzing the composition of plant tissue.²
- Additional conservation benefits such as on-farm and downstream soil erosion control will increase the value of crop residue beyond its nutrient content alone.

¹ James Hoorman & Rafiq Islam. 2010. [Understanding Soil Microbes and Nutrient Recycling](#). Fact Sheet SAG-16-10. Ohio State University Extension.

² William Edwards. 2011. [Estimating a Value for Corn Stover](#). Ag Decision Maker A1-70. Iowa State University Extension.