RIPE
Rural Investment to Protect our Environment

Methodology and Sources for Cover Crops

Ecosystem Service	$/Acre/Year	Citation
GHG Mitigation (at $51/tonne CO2e)	$15	The USDA COMET-Planner shows that cover crops provide a national average greenhouse gas value of 0.29 tonnes per acre. At $51 per tonne of CO2e, the public benefit value equals $15 per acre.
Water Quality	$67	According to the Sustainable Agriculture Research and Education (SARE) report "Cover Crops Improve Soil Conditions and Prevent Pollution," (2015), cover crops reduce soil erosion by 20.8 tons per acre on conventional-till fields, 6.5 tons per acre on reduced-till fields and 1.2 tons per acre on no-till fields, or an average of 9.5 tons per acre. In "Final Benefit-Cost Analysis for the Environmental Quality Incentives Program (EQIP)," NRCS (2010) values the water quality benefits of reduced soil erosion at $7 per ton in 2022 dollars. Multiplying the average erosion reduction rate of 9.5 tons of soil per acre by $7 per ton of soil yields a water quality value of $67 per acre.
Air Quality	$8	NRCS's report, "Final Benefit-Cost Analysis for the Environmental Quality Incentives Program (EQIP)" (NRCS, 2010) identified benefits and their transfer values from EQIP practices and identified which stewardship practices led to different categories of benefits. Cover crops were identified as a practice that led to improvements in "sheet and rill water erosion, and air quality." The air quality value identified in this report was $5.71 per acre per year, which was converted to 2022 dollars.

Healthy Soil	$26	This number is an average taken from two papers: Pimentel, et al. "Environmental and Economic Costs of Soil Erosion and Conservation Benefits." Science, Vol 267, Issue 5201, 24 Feb. 1995, pages 1117-1123., doi:10.1126/science.267.5201.1117.; and USDA/NRCS, Final Benefit-Cost Analysis for the Environmental Quality Incentives Program (EQIP), May 10, 2010. The USDA article valued the reduction of loss of nutrients from planting cover crops at $2 per ton of soil in 2022 dollars. This figure was multiplied by the average cover crop soil erosion reduction of 9.5 tons of soil (SARE). Pimentel, et al. calculated a cost of $3 per ton of soil for nutrients, which was converted into $32 per acre per year in 2022 dollars.
Water Savings	$15	In the economic tool "Cover Crop Economics" version 3.1, USDA lists a 5.41 acre-inch water efficiency gain per year with the use of cover crops, which is valued at $10.30 per acre in 2007 dollars. Updating this value to 2022 dollars yields a water conservation value of $15 per acre.
Total	**$131**	