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Cover Crop Economics

Many farmers ask what is the value of planting cover crops on my farm? A common question with many answers. Cover crops have many benefits and uses, so the answer varies by farm field and farming operation. Cover crops have value even if yields do not immediately increase because they may reduce some pests (weeds, insects, diseases); decrease fertility costs; improve soil structure; decrease soil erosion and nutrient loss; and can be used for grazing or for forage. Many cover crop benefits accrue over time, so immediate changes may at first be difficult to see.

One of the biggest benefits to cover crops is the addition of soil organic matter (SOM). Each 1% SOM addition is worth between \$500 to \$600 in soil fertility. A typical cover crop adds 0.1 to .15% SOM yearly valued at \$50-90 per acre. Cover crops add roots and surface cover which greatly increases SOM and improves soil fertility. Calculations done by USDA-SARE in a Technical Bulletin: Cover Crop Economics (2019) show that cover crop seed costs range from \$10-\$50 per acre, planting \$5-\$18, and termination \$0-\$10 with a cover crop cost range between \$15-\$78 and an average of \$37/acre. The yearly increase in SOM is enough to pay for the cover crop seed, planting, and termination on no-till farms.

Some of the reduced costs include out competing severe weeds like marestail, waterhemp, giant ragweed, and pig weed species like Palmer Amaranth saving \$27/acre in reduced herbicide costs. In no-till systems, yearly reductions average \$24/acre in reduced tillage costs and \$15/acre in compaction cost. For farmers with livestock, cover crops can be grazed or used as forage, adding \$50/acre on average. Federal and state cover crop payments may range from \$50-60/acre depending upon the program. Cover crops can greatly improve the bottom line depending upon your farming operation.

One of the biggest savings from cover crops comes in the form of reduced soil erosion and reduced nutrient runoff. The average Ohio soil erosion rate is 2.62 tons/acre/year. Cover crops may reduce this loss down to hundreds of pounds versus tons of topsoil lost/acre/year. Assuming 2.5 tons saved at \$10 per ton, farmers save \$25 per acre in topsoil. Leveling soil ruts and fixing soil erosion problems averages \$2-4/acre. Cover crops reduce nitrogen losses from fertilizer or manure by an average of 48%. The fertility savings in keeping nutrients on the land and out of surface water is at least another \$15 per acre. Legume or clover cover crops, while more

expensive, may add 75-200# of additional nitrogen at \$.40/pound of nitrogen worth \$30-\$80/acre. Thus, cover crops improve water infiltration, reduce nutrient runoff, add fertility, and improve water quality.

The biggest increase in crop yields occur in dry years due to improved water infiltration and water retention, averaging 9.6% on corn and 11.6% on soybeans with added income ranging from \$59-\$93/acre/farm. The benefits accumulate and increase as the soil heals and becomes more resilient over time. In wet years, the yield increase may only average 1.9% for corn and 2.8% for soybeans, which may be only enough to pay for the cover crop seed. The average yield increase from 2012-2016 was 3.6% for corn and 5.3% for soybeans.

If cover crops are used consistently, on average, they start paying off after about 3 years. It generally takes 3 years to see soil improvements from better soil structure, improved water infiltration, higher SOM levels, improved water retention, and improved fertility. Why would a farmer invest in cover crops if it takes 3 years to see a difference? The same question can be asked about tile? Systematic tile costs about \$1,000/ acre and may take 10 years to pay off, but it pays off in the long-run. The same can be said for cover crops, it's a long-term investment in your soil. Some farmers have found that they can even reduce splitting or adding more tile by planting cover crops. The added roots increase water infiltration and drainage to make the existing tile work more efficiently so that new tile may not be needed.

Depending upon your soil problems, cover crops can start paying off immediately or the returns may be slower (2-5 years), but cover do pay in the long-run. The USDA Census of Agriculture says cover crop acreage increased nationally 50% from 2012 to 2017. If cover crops did not pay, farmers would not be planting cover crops. Future generations will appreciate your investment in soil conservation!