The Value of Actively Managing Your Corn & Soy

FARM'S CLIMATE FOOTPRINT

The stable climate Midwestern farmers have depended on for decades is already changing. Urgent action is needed to avoid the worst impacts of climate change by rapidly driving down greenhouse gas (GHG) emissions across the global economy, including agriculture.

Maintaining a thriving agricultural sector in the Midwest hinges on the success of the Paris Agreement — a global accord to tackle climate change. Success requires industries across the board to cut global carbon dioxide (CO_2) emissions by 45% by 2030 and achieve global net-zero CO_2 emissions by 2050, along with steep reductions in other GHG emissions, like methane and nitrous oxide.

Farmers can play a role in meeting this critical global accord by taking action on the farm and supporting a drawdown of emissions across all sectors of the economy.

Many of the actions necessary to reduce emissions on the farm can also improve a farm's performance and build resilience in the face of extreme weather, which is increasing with climate change. **Few industries have as much to gain by tackling climate change.**

This will require a mindset of continuous improvement to actively manage a farm's footprint by implementing a broad suite of sustainable management practices through actions like cover cropping, reduced tillage, smart fertilizer application, and reduced fuel and energy use. As farmers reduce emissions, they will be positioning their farms for the future while helping to maintain Midwest agriculture's competitiveness in global trade long term.

In all industries, emissions are categorized into three scopes to distinguish where emissions occur.

ANNUAL MIDWESTERN EMISSIONS FROM

CORN PRODUCTION:

250 Mt CO_2e

SOY PRODUCTION:

180 Mt CO_2e

(Million metric tons of carbon dioxide equivalent)

Midwest corn and soy production combined emissions are equivalent to 92.7 million cars, or roughly 10x as many cars on Illinois roads.[1]

SCOPE 3 All other indirect emissions resulting from the manufacture of farm inputs such as fertilizers and pesticides.

SCOPE 2
Emissions from purchased electricity used on farm.

SCOPE 1
All direct emissions that occur on the farm, including emissions from soil and nutrient management and the use of fuel and energy to operate farm equipment.

[1] The estimates of corn and soybean emissions in the Midwest are derived from Xu, X., Sharma, P., Shu, S. et al. Global greenhouse gas emissions from animal-based foods are twice those of plant-based foods. Nat Food 2, 724–732 (2021).

What does actively managing your farm's footprint look like?

Nearly every management decision impacts a farm's footprint, whether by building the carbon stock in the farm's soil, lowering fossil fuel energy use, or reducing the amount of synthetic fertilizer (an energy-intensive product to make). A full farm footprint includes both direct on-farm emissions (Scope 1 and 2) and indirect emissions (Scope 3). It also considers innovative farm management and practices that absorb carbon emissions from the atmosphere on the farm, such as improving soil health or planting trees.

Using two decision-support tools* (COMET and COOL Farm), here are the estimated emissions of a typical central Illinois row crops operation (pie chart).

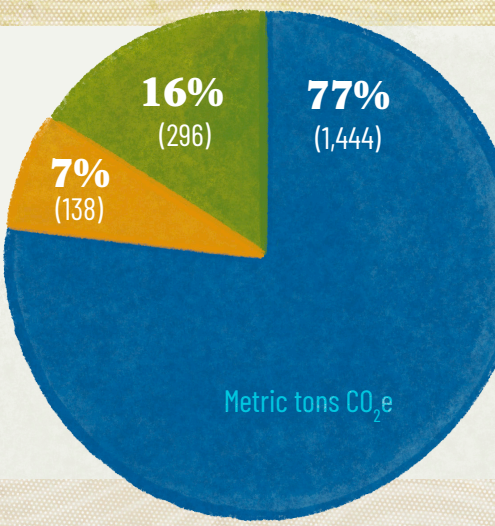
Many practices don't just reduce a farm's footprint, they can build farm resilience AND save costs. They offer benefits for soil health, wildlife, water and air quality. To have the greatest impact, a broad variety of practices must be implemented continuously.

See how various crop management, land use, and energy efficiency scenarios can create potential GHG reductions and farm ecosystem co-benefits.

TYPICAL MIDWEST CORN/SOY FARM CLIMATE FOOTPRINT

Here is an example of a total* emission footprint over two years on a 1,000-acre central Illinois farm, which utilizes a corn/soy rotation, two full-width tillage passes before each crop is planted, and applies nitrogen in the fall before the corn crop.

- FERTILIZER PROCESSING
- ENERGY USE
- ON-FARM LAND MANAGEMENT



LAND USE MANAGEMENT PRACTICES

- Prairie/grass-based plantings

+ SOIL HEALTH
+ WATER QUALITY
+ WILDLIFE

- Riparian buffer along waterways
- Hedgerows, windbreaks and alley cropping

+ WATER QUALITY
+ WILDLIFE

INTEGRATED CROP MANAGEMENT PRACTICES

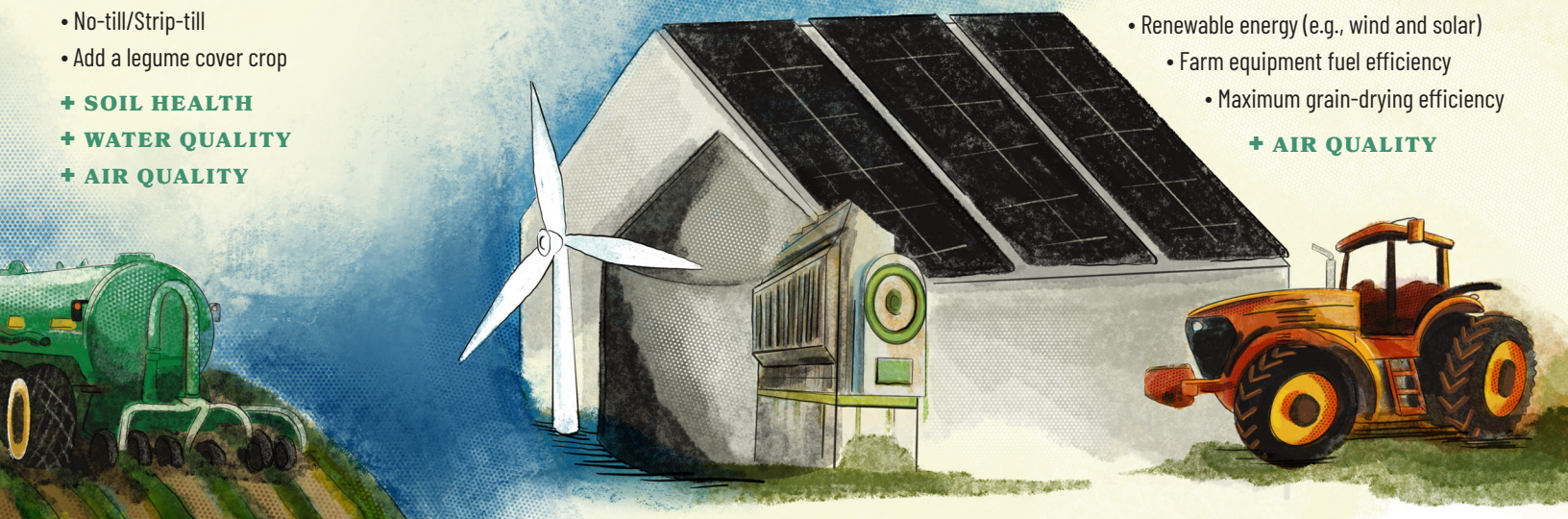
- Reduce synthetic N use (and/or replace with manure)
- No-till/Strip-till
- Add a legume cover crop

+ SOIL HEALTH
+ WATER QUALITY
+ AIR QUALITY

ENERGY EFFICIENCY PRACTICES

- Renewable energy (e.g., wind and solar)
- Farm equipment fuel efficiency
- Maximum grain-drying efficiency

+ AIR QUALITY



In Summary: To reach the Paris Agreement goals, it's going to take every business, in every sector, to do their part in lowering emissions. Ag conservation partners across the Midwest are ready to work with farmers and their suppliers to find solutions that are good for the farm and good for the environment to prevent further climate change impacts. Reach out for more information, tools and resources to assess your farm's footprint.

American Farmland Trust · The Nature Conservancy · LAND +WATER · Department of Agriculture, Trade and Consumer Protection, Wisconsin

*This analysis was performed using USDA's COMET-Farm and Cool Farm Alliance's COOL Farm Tool. Currently, no single tool calculates every possible scenario (equipment fuel use, fertilizer processing, land use, etc). Note, these models do not include processing beyond the farm.