

# Small Grains, Large Gains

## 5 Reasons Why Diverse Crop Rotations are Good for Iowa

Many farmers have known this for years, but recent university research shows that adding a third crop – a small grains crop such as oats – to the more common 2-year corn-soybean crop rotation would support soil and water conservation, making Iowa's rural communities more resilient.

### 1 Protect and Build Healthy Soils

**Diverse crops** grow **diverse roots** in the soil, which provide habitat for more soil life. These roots and soil microorganisms improve soil structure, increase organic matter and help prevent erosion.

3-year rotations have...

- 31%** more particulate organic matter carbon
  - 24%** more microbial biomass
  - 21%** less erosion
  - 10%** lower bulk density
- ...than 2-year rotations



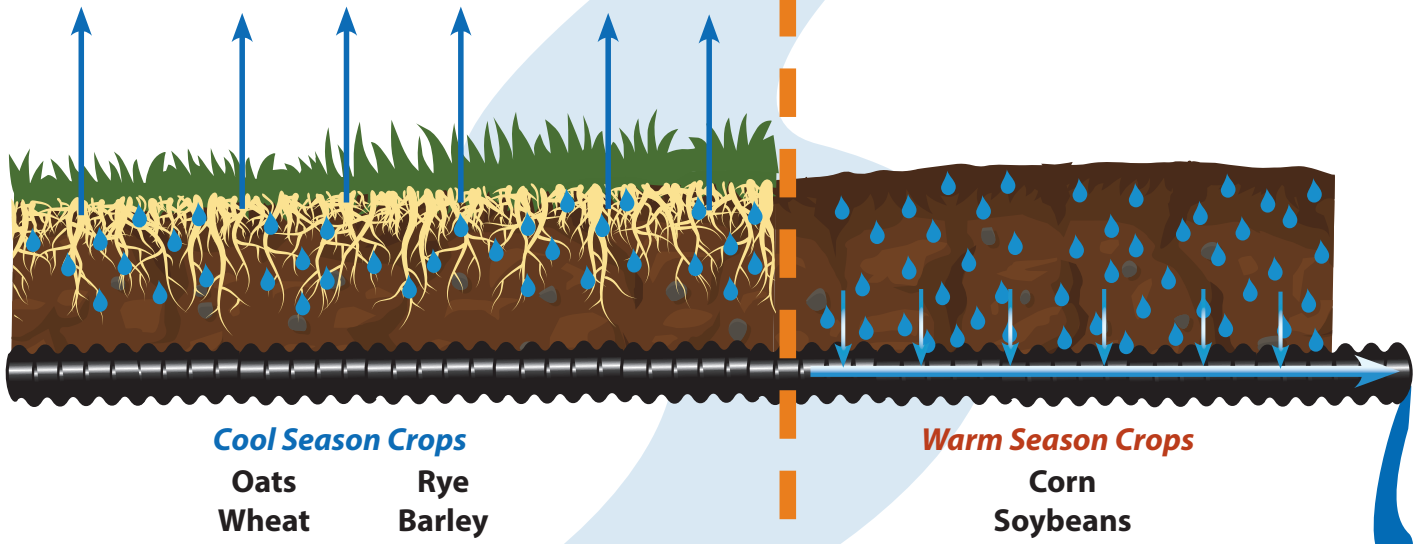
### 2 Improve Water Quality

Small grains are cool season crops, meaning they grow in the fall and spring, helping to **keep roots in the ground year round**.

April-May in Iowa

Actively growing plants and roots capture nitrate-rich water from the soil, and use the nitrates and water for growth, which keeps the water from draining into streams and rivers.

If plants don't grow during the rainy spring months (when large amounts of nitrates are produced), water can leach through the soil and be lost, along with the nitrates, to rivers and streams.



### 3 Cut Pesticide Use

Because diverse rotations can control weeds effectively with up to **6 times less herbicide** use, their potential **freshwater ecotoxicity** is up to **200 times lower** than that of a corn-soybean alternation.

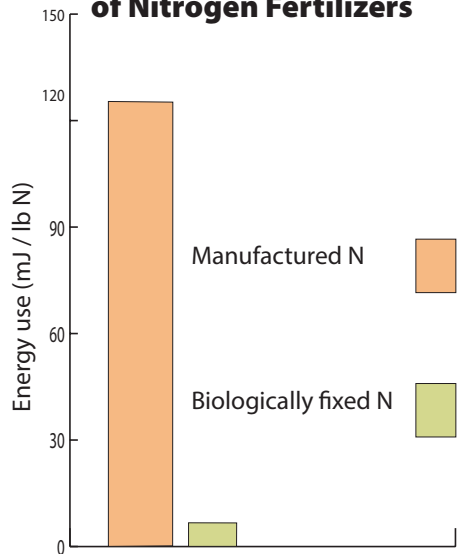
"It's good to know my farm supports biological diversity."

- Dick Sloan, PFI Member

### 4 Reduce Fossil Energy Use

Small grains are harvested in the summer, which lets farmers grow legume cover crops – like red clover, hairy vetch or alfalfa – during warm weather. This gives the cover crops ample time to fix nitrogen and **decreases the amount of fertilizer** farmers have to purchase. Because the process to manufacture nitrogen fertilizer requires large amounts of energy, growing plants that fix nitrogen helps reduce fossil energy use.

Energy Requirements of Nitrogen Fertilizers



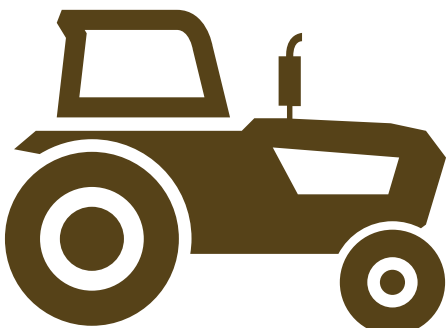
3-year rotations use...

- 88%** less mineral fertilizer
  - 56%** less fossil energy
- ...than 2-year rotations



### 5 Diversify Farm Income and Labor Needs

Because small grains are harvested at a different time of year than corn and soybeans, diverse rotations offer potential to **spread out labor** and provide more steady **cash flow** throughout the year.



"The ability to diversify my operation is the key. The more diversified your operation, the more able you are to ride through the rough trends by subsidizing your operation one place or another."

- Wade Dooley, PFI Member