All Those Problems, Yet…

1. **Soil Degradation is a Global Problem**

<https://www.mdpi.com/2071-1050/8/3/281/htm> (see map in section 1.4)

*Soil degradation is mostly due to erosion and declining fertility. Regenerative agriculture reverses soil erosion and increases fertility.*

**2. Heavy Downpours More Frequent in Warmer Atmosphere that Holds More Water Vapor**

<https://www.climate.gov/news-features/featured-images/heavy-downpours-more-intense-frequent-warmer-world>

*Heavy downpours cause surface runoff that causes soil erosion and flooding. Regenerative agriculture increases water infiltration rates from <1 inch per hour to >10 inches per hour. Thus downpours need not erode soil or cause flooding in most settings.*

3. **Midwest flooding and Great Lakes to Record Levels by May 2019**

<https://www.jpl.nasa.gov/spaceimages/details.php?id=PIA22840>

optional view that might be of interest:

<https://www.ncdc.noaa.gov/temp-and-precip/drought/historical-palmers/phd/201901-201906>

*Arctic warming is likely the primary cause of high amplitude jets stream waves that cause persistent wet patterns or droughts, depending on location. Regenerative agriculture increases both water infiltration rates and humus and thus water holding capacity, reducing flooding and droughts.*

**4. Dead Zone in Gulf of Mexico**

Image with explanation of causes:

<https://www.noaa.gov/media-release/large-dead-zone-measured-in-gulf-of-mexico>

*By 1) reducing surface runoff, 2) increasing water hold capacity of soils, and most importantly 3) virtually eliminating commercial fertilizer (key cause of the dead zone) as an input, increasing adoption of regenerative agriculture will reduce dead zones dramatically.*

**5. Crop Yield Risks Rise in Changing Climate (more drought, heat yet more damaging downpours)**

<https://www.sciencedirect.com/science/article/pii/S0048969718343341#ec0005>

*By 1) reducing soil erosion, 2) increasing water infiltration rates and soil water-holding capacity, 3) improving root access to moisture through healthy rhizosphere-based hyphae, and 4) reducing soil temperatures by cover crop use, regenerative agriculture stabilizes crop yields*.

**6. The Unsustainable Pumping of the Ogalalla Aquifer is 30 Percent of US Irrigation Water Use**

<https://www.scientificamerican.com/article/the-ogallala-aquifer/>

*By reducing soil erosion, increasing water infiltration rates and the water-holding capacity of soil, and improving root access to moisture through healthy rhizosphere-based hyphae, regenerative agriculture can reduce the need for unsustainable withdrawals from ancient groundwater reserves.*

**7. Farmers are Caught in a Revenue Trap with Increasing Input Costs and Depressed Crop Prices**

Farmers are trapped in an agrochemical input treadmill and rising crop losses due to pests and other pathologies induced by agroecosystem imbalances. Overproduction has caused falling commodity prices, forcing smaller operators out of business. [Rising costs take a greater share of total revenue, or even exceeding it.](https://wou.edu/~mcgladm/Geography%20105%20%20Physical%20Geography/connected%20to%20soil%20carbon/learning%20about%20soil%20carbon/) About 90 percent of income of North American farm households comes from government payments and off-farm income. The average age of American farmers has risen from 50 years to 58 years, suggesting a lack of interest in young adults. [www.modernfarmer.com](http://www.modernfarmer.com) various issues

Regenerative agriculture substitutes cover cropping and multiyear crop diversity to improve soil health and biology. Pests and nutrient supply are managed through improved soil biology and zero or near-zero usage of fertilizers and other agrochemicals. Due to dramatically lower input costs and still-adequate yields, [profits and inter-annual revenue stability can be achieved](https://www.youtube.com/watch?v=uUmIdq0D6-A). Accordingly, regenerative agriculture as configured to local conditions can be profitable on smaller farming units than typical for conventional farming operations. Regenerative agriculture uses nature’s services rather than purchased inputs from agrochemical industry.

**8. Yet we keep putting more carbon dioxide into atmosphere through fossil fuel combustion:** <https://www.climate.gov/news-features/understanding-climate/climate-change-atmospheric-carbon-dioxide>

*By sequestering carbon dioxide from the atmosphere, and reducing or eliminating the use of fossil fuel-based commercial fertilizers, studies suggest that from 10 to 80 percent of current fossil fuel carbon emissions could be reduced and offset through regenerative agriculture and ranching practices.*