

What is Regenerative Agriculture and Can it Help Us Reduce Effects of Climate Change?

With our global population expected to rise by 83 million per year, how are we going to reduce agricultural effects on climate change? Some producers and scientists believe that regenerative agriculture is the answer. Rather than simply not causing further harm to land, regenerative agriculture works to restore land. To understand this, it is imperative to understand common regenerative agriculture practices, how these could reduce impacts of climate change, and the barriers to implementation.

Common Practices

There are five practices widely recognized as regenerative agriculture techniques.

1. Limiting soil disturbance: By avoiding ploughing, tilling, and soil compaction, soil structure and water drainage is improved while simultaneously minimizing soil erosion rates. Reducing soil erosion and maintaining soil structure promotes the health of the top layer of soil, which is commonly referred to as soil organic matter (SOM). This essential “living layer” of soil is full of microbes that break down plant residues into nutrients for plants and play a part in storing carbon. Avoiding chemical use is also imperative to protecting these microbes and their food sources.

2. Maintaining soil cover: By avoiding overgrazing and keeping soil covered with cover crops or mulch, soil erosion is reduced and soil microbes have continuous access to food. Covering the soil also protects it from rapidly fluctuating temperatures and moisture content, which is also beneficial for microbes. Finally, cover crops suffocate weeds, eliminating the need for herbicides.

3. Increase biodiversity: Rotating crops planted in a given area and promoting habitats for beneficial insects like pollinators helps create a natural resilience in an agriculture system. Different plants leave different residues, like nitrogen, carbon, phosphorus, which in turn create a diverse diet for the microbes. Once the microbes break down these diverse residues, plants are able to easily uptake the nutrients through their roots. The diversity in nutrients that the plants have access to can eliminate the need for synthetic fertilizers.

4. Preserve living roots: Living roots also play a part in maintaining soil structure. Roots keep soil anchored so it is not easily eroded by wind or water, while also aerating the soil for efficient water absorption. Additionally, plant roots and microbes are in a symbiotic

relationship. They exchange nutrients, like carbon, to keep each other healthy. Without existing roots, microbes are deprived of nutrients and are not as hearty when new plants are growing.

5. Animal integration: Allowing livestock to graze crops that are not being grown for profit, like cover crops, naturally and gently breaks up soil. This process enables new plants to have easier access to nutrients because it creates an organic mulch from plant matter and manure that increases SOM.

Key Takeaways

Soil organic matter (SOM) is the top “living layer” of soil that is teaming with microbes. This layer plays a crucial role in providing nutrients to plants. In conventional agriculture systems, where one crop is planted continuously or soil is left exposed after harvest, this layer is in danger of erosion and malnutrition due to lack of diverse food sources. Without this layer, plants struggle to grow, carbon storage capacity of soil decreases, and there is a higher need for chemical inputs.

How Can Regenerative Systems Help Us Reduce the Effects of Climate Change?

Climate change poses a significant threat to our food system. Extreme variability in temperature, droughts, floods, high winds, and an increase in pest and disease issues can destroy soil health and make land infertile. Conventional agriculture systems that only plant one crop, utilize tilling, and rely on chemicals, have already played a part in reducing soil fertility. That is why regenerative agriculture is working to restore the fertility that was lost, not just work with what remains.

Regenerative agriculture preserves resources like water and fossil fuels. By prioritizing the health of SOM and keeping soil covered, water is more likely to be retained by the system rather than lost to runoff and evaporation. Due to the regenerative agriculture principle of reducing soil disturbance, less heavy machinery is used, decreasing the need for farm equipment fuel. The effects of protecting SOM are significant.

Soil is a huge carbon storage bank, second only to the ocean. Research estimates that there are 3.5 billion acres of land that could be transitioned to regenerative practices. This change could sequester 40% of our current greenhouse gas emissions. While this would take years to implement and even more time to reverse the effects of conventional agriculture techniques, it provides a massive opportunity to decrease greenhouse gasses.

Agriculture is often made the scapegoat of climate change discussions. With regenerative agriculture, not only is the industry reducing their own emissions and preserving resources, it is also restoring the land to be able to sequester significantly more emissions.

If This Method is So Brilliant, Why is it Not More Common?

- 1. Cost:** It is expensive to transition a large operation to an entirely new production method. Producers aren't yet convinced that they will receive economic and environmental returns that match the money and labor they would need to expend to make the system operational.
- 2. Education:** Producers do not have access to adequate training or support when working to adopt these techniques.
- 3. Lack of Research:** Limited funding for research in a variety of different environments has raised questions whether regenerative agriculture is applicable in all environment types.
- 4. Policy Challenges:** Policies in the United States favor conventional agriculture practices. If more incentives were offered to support a transition to regenerative agriculture, this shift may not be as difficult.
- 5. Producer Preferences:** Sticking with family traditions prevents some producers from transitioning their farms to regenerative systems.
- 6. Consumer Preferences:** Consumers do not support these methods enough to incentivize a change from producers. Purchasing and voting decisions have a major impact on production decisions. Consumers would have to be more intentional about their decisions to impact the production process.

What Lies Ahead

Climate change will continue to affect our food system. Intense and unexpected weather changes devastate production. Regenerative agriculture allows systems to be more resilient to these changes, ensuring we can feed our population while restoring the land we rely on. It is imperative that we recognize our role in the food system, whether that be producing, distributing, or purchasing, to make choices that benefit our futures.



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