

21 ACRES



AGROECOLOGY

Healthier soils lead to a cooler planet. Traditional agriculture is a major contributor to climate change. But agroecology—whole-systems thinking that considers both environment and humans in the food system—is a solution.

By using historically and culturally tested land stewardship practices and responding to the needs of both people and environment, agroecology and regenerative farm practices such as efficient irrigation, cover cropping, conservation tilling, and nutrient management can draw carbon out of the atmosphere and use it to boost soil health and grow nutritious food.

Agroecology challenges us to find community-centered answers to enrich the food system and strike at the root causes of hunger and poverty. For information about equity and social movements related to agroecology, jump to our [Climate Justice](#) page.

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Soil and Climate Change

[Earth's Rapidly Degrading Soil Is Bad News For Human Health](#) | *Forbes*

Healthy soil requires living mixtures of minerals, microbes, air, water and around 4 per cent organic matter, such as carbon, nitrogen, and hydrogen in order to sustain plant growth, but due to industrial farming methods such as mono-cropping, intensive tilling, lack of cover crops, and the use of pesticides and synthetic fertilisers, approximately one third of the world's productive topsoil has been depleted, leaving it with just half a percent of organic matter— eight times less than it needs.

[Kiss the Ground](#)

This documentary, book, and climate action project detail the importance of soil health in agriculture and on the planet.

[Using Soil to Fight Climate Change](#) | *Rutland Herald*

Agriculture, with its unique ability to sequester carbon on, as Carl Sagan might say, billions and billions of acres, is the only industry poised to reverse global warming. Improved management of cropping and grazing heals land, boosts soil fertility, prevents flooding, enhances drought resilience, increases the nutritional content of food and restores wildlife habitat — while sequestering carbon

[Growing Solutions: Soil, Water, Farmers, Seeds, Roots](#) | *Johns Hopkins Center for a Livable Future*

In the face of threats to our farming future such as climate change, people are innovating to protect and regenerate our most vital resources – soil, water, seeds, and our farmer workforce. Growing Solutions features a centuries-old water conservation method, a farmer who's growing topsoil faster than most thought possible, a seed-saving high school, a farmer training program for military veterans, and researchers who are developing a perennial style of agriculture that mimics the prairie.

[Living Soil Film](#) | Soil Health Institute

This 60-minute documentary features innovative farmers and soil health experts from throughout the U.S.

[Can Regenerative Agriculture Reverse Climate Change?](#) | NowThis Earth

Here's why regenerative agriculture might be the key to securing a safe and healthy future.

[Soil: The Secret Weapon in the Fight Against Climate Change](#) | NRDC

Agriculture is an important—in fact a *necessary*—partner in fighting climate change. The science is clear: We cannot stay beneath the most dangerous climate thresholds without sequestering a significant amount of carbon in our soils.

[Regenerative Agriculture Can Reduce Global Warming](#) | Bio-Integral Resource Center

Up to one-third of global greenhouse gases come from agriculture. Synthetic pesticides and fertilizers lead to releases of carbon dioxide (CO₂), methane, and nitrous oxide (N₂O). Monocultures and tillage oxidize soil organic carbon, releasing carbon dioxide.

[Climate smart or regenerative agriculture? Defining climate policies based on soil health](#) |

Global Development And Environment Institute at Tufts University

Soil-based carbon storage strategies recently secured the spotlight at global governance forums, earning attention for their value as carbon sinks and as a key component of international food security.

[Regenerative agriculture: merging farming and natural resource conservation profitably](#) | PeerJ

Farmers have developed a regenerative model of farm production that promotes soil health and biodiversity, while producing nutrient-dense farm products profitably.

[State of Knowledge of Soil Biodiversity](#) | Food and Agriculture Organization of the United

Nations

There is increasing attention to the importance of biodiversity for food security and nutrition, especially above-ground biodiversity such as plants and animals. However, less attention is being paid to the biodiversity beneath our feet, soil biodiversity, which drives many processes that produce food or purify soil and water.

[Climate 21 Project](#) | Department of Agriculture

Agriculture and forestry are central to climate mitigation and adaptation. Through actions in both sectors, agriculture and forests can provide 10-20% of the additional sequestration and emissions reductions needed to achieve net zero emissions by 2050.

Agriculture Techniques

[Classes & Events](#) | 21 Acres

Join us for a free program or farm tour to learn how we farm and why climate change is so vital to us.

[What is Agroecology?](#) | 21 Acres

Agroecology is the study of ecological principles applied to agriculture, or the practice of using ecological theory to understand, manage, and design agricultural systems. Here at 21 Acres, we consider ourselves practitioners and students of agroecology. It's one of the core philosophies behind our understanding of how we interact with the food system, with each other, and with our land.

[The evolution of agroecology as a practice, a research discipline, and a social movement](#) |

Center for Agroecology & Sustainable Food Systems

A panel of experts give five-minute "lightning talks" on their interpretation of the evolution of agroecology as a practice, research discipline, and social movement.

[Nutrient Management](#) | *Project Drawdown*

Overuse of nitrogen fertilizers—a frequent phenomenon in agriculture—creates nitrous oxide. More efficient use can curb these emissions and reduce energy-intensive fertilizer production.

[Conservation Agriculture](#) | *Project Drawdown*

Conservation agriculture uses cover crops, crop rotation, and minimal tilling in the production of annual crops. It protects soil, avoids emissions, and sequesters carbon.

[Boosting the Soil with Cover Crops](#) | 21 Acres

Growing cover crop is among the most important practices we undertake as farmers. Simply put, a cover crop is a plant grown primarily for the benefit of the soil rather than the crop yield. This is a regenerative farming practice that increases soil resiliency and builds soil health.

[Regenerative Annual Cropping](#) | Project Drawdown

Building on conservation agriculture with additional practices, regenerative annual cropping can include compost application, green manure, and organic production. It reduces emissions, increases soil organic matter, and sequesters carbon.

[As cover crop acreage adds up, more benefits emerge](#) | *Successful Farming*

More than 90% of farmers participating in a national cover crop survey reported that cover crops allowed them to plant earlier or at the same time as non-cover-cropped fields in 2019. Among those who had “planted green,” seeding cash crops into growing cover crops, 54% said the practice helped them plant earlier than on other fields.

[Seed Saving is a Radical Act](#) | 21 Acres

Seed saving is one of the most radical acts a farmer can undertake and one the most culturally and ancestrally significant. It’s one means by which we as farmers can take greater control of the food system, feel connected with our ancestral food ways, and preserve our cultural history and identity.

[Farm Irrigation Efficiency](#) | Project Drawdown

Pumping and distributing water is energy intensive. Drip and sprinkler irrigation, among other practices and technologies, make farm water use more precise and efficient.

[Raising Sustainable Pork: Why Pastured Pigs?](#) | 21 Acres

Raising pigs on pasture provides a healthy and engaging lifestyle for the pigs, a more nutritious and flavorful end product for the pork consumer, and an opportunity to engage with the local agricultural economy.

[Carbon Footprint Evaluation of Regenerative Grazing at White Oak Pastures](#) | Quantis

Livestock products, especially beef, are often shamed for having high carbon emissions. However there are potential benefits to raising livestock, including climate benefits in cases where soil carbon is being accumulated.

[Biochar helps hold water, saves money](#) | Rice University via Science Daily

The abstract benefits of biochar for long-term storage of carbon and nitrogen on American farms are clear, and now new research from Rice University shows a short-term, concrete bonus for farmers as well.

[Farmers need to adapt crops to climate change to stay profitable, experts say](#) |

Marketplace.org

Climate change has become more and more real for Americans over the past few decades. This has major implications for American agriculture.

[Ecologically friendly agriculture doesn't compromise crop yields](#) | University of British Columbia via ScienceDaily

Increasing diversity in crop production benefits biodiversity without compromising crop yields, according to an international study comparing 42,000 examples of diversified and simplified agricultural practices.

Policy and Data

[Investing in the transition to sustainable agriculture](#) | *Environmental Science & Policy*

Ecological impacts of industrial agriculture include significant greenhouse gas emissions, loss of biodiversity, widespread pollution by fertilizers and pesticides, soil loss and degradation, declining pollinators, and human health risks, among many others. A

rapidly growing body of scientific research, however, suggests that farming systems designed and managed according to ecological principles can meet the food needs of society while addressing these pressing environmental and social issues.

[Healthy Soils Law Project](#) | *Farm and Energy Initiative*

The Healthy Soils Law Project is an investigation of strategies for state governments to develop policy mechanisms that effectively support environmental stewardship in U.S. agriculture.

[Agriculture may be 'first and best place' for climate gains, says Vilsack](#) | Fern's Ag Insider

With USDA's broad authority to aid farmers, Vilsack said he could launch carbon sequestration initiatives that soon would become a standard part of the federal farm program.

[Farm and Food System Map](#) | King County

Learn about your local farms and the local Agricultural Production District (APD) from food system data collected by King County in Washington.

[Farmers Data](#) | Farm King County

Working toward a food system that supports viable livelihoods for all farmers. Learn about the demographics of local farmers.

Who to Follow

[Rodale Institute](#) | Rodale Institute is growing the regenerative organic movement through research, farmer training, and consumer education.

[Stone Barns Center for Food & Agriculture](#) | 300+ acres in the Rockefeller State Park Preserve focused on education and research about regenerative land management.

[National Young Farmers Coalition](#) | A national advocacy network of young farmers fighting for the future of agriculture.

[La Via Campesina](#) | International peasants' movement fighting for farmworker rights.

[Groundswell Center](#) | Groundswell empowers people from diverse backgrounds with skills, knowledge, and access to resources, so we can work together to build a more just, sustainable food system.

[Center for Agroecology & Sustainable Food Systems](#) | Research, education, and public service organization dedicated to advancing an ecologically sustainable and socially just food system.

[SoulFire Farm](#) | An Afro-Indigenous centered community farm committed to uprooting racism and seeding sovereignty in the food system.

[Agroecology & Livelihoods Collaborative](#) | They co-create evidence and knowledge, with farmers and other actors, to cultivate socially just and ecologically sound food systems.

[Traditional Center for Indigenous Knowledge and Healing](#) | Provides a place in which all people can seek refuge, sharing an understanding of the world through traditional culture and healing practices, while providing and maintaining a culturally safe place for the indigenous community.

Questions? Contact Us.

Have an idea? We want to connect with you about climate solutions. Join us on a free farm tour or send an email: generalinfo@21acres.org