

HEALTHY SOIL FOR A HEALTHY FUTURE

Soil quality affects the health of our planet, our food, and ourselves. Some say it's the answer to the climate crisis — but it's turning to dust. Can our food choices help? *Hatty Willmoth* writes

Soil might be the most important issue you don't already know about.

In the wake of the hottest, driest summer on record, we are already feeling the effects of climate change. Soil could help quell the storm. In the words of *Kiss the Ground*, a 2020 Netflix documentary, "it could just be the one thing that could balance our climate, replenish our fresh water supplies, and feed the world".¹

Carbon dioxide (CO₂) is arguably the most significant greenhouse gas — humans emit around 30 billion tons of it per year.² But soil is a carbon bank; it can draw down CO₂ from the air via plants conducting photosynthesis, locking carbon into the ground and releasing oxygen. This is called carbon sequestration, and it could halt the march of climate change.

Good soil also holds more moisture, promoting rainfall, reducing the likelihood of flash flooding, and cooling the local daytime environment. When alive with plants and microbes, it encourages biodiversity. But our good soil is disappearing.

Turning to dust

Unsustainable agricultural practices are eroding our soils. A global study led by Lancaster University analysed soils from 255 locations in 38 countries across six continents, and found that 90% of conventionally farmed soils were thinning, and more than a sixth had lifespans of less than a century.³

Tom Denman knows all about this. He set up Chefs Farms,⁴ a fruit and veg wholesaler that buys produce from a cooperative of farms in the southeast



IN BRIEF

- Conventional agriculture is eroding our soils with tilling, monocropping and harsh chemicals.
- Regenerative practices help restore soils by harnessing natural processes.
- Soil is a carbon bank, so it can draw down CO₂ from the atmosphere.
- Livestock such as cows and sheep are crucial and complex pieces of the puzzle.

of England and sells it to the hospitality sector and farm shops, and which asks its growers to use techniques that "improve soil diversity, biodynamics within the crop, biodiversity, and also carbon sequestration". Denman is also part of Root to Market supply chain consultants, which encourage sustainable practices.

He says: "The problem with the growing technique is that soil is seen as a growing medium, not as a growing platform. People grow stuff in the soil; they don't work with the soil to grow stuff."

Tilling, for example, is a method of industrial ploughing that breaks up the soil with heavy machinery, clearing it of debris to plant new crops. But as a result, soil becomes less able to retain moisture and sustain life, and more susceptible to erosion.⁵

Julie Cleijne is the founder and CEO of Sustainable Kitchen Consultants (SKC),⁶ a specialist food consultancy of chefs and supply chain experts that works to quantify and reduce negative impacts of food production on the environment and human health. She is also a soil consultant.

Monocropping, she says, is a big problem. This is when the same ground grows a single crop for an extended period of time. "Monocropping was introduced to farming to produce food as commodities, to obtain higher yields, consistency and speed of production, at the expense of our environment," she says. "Monocrops remove diversity from our soils and this has led to a reduction in biodiversity of animal, plant and insect life."

Another issue is chemicals sprayed on soils. Synthetic fertiliser enables bad land to produce a good crop, but depletes soil further in the process. Spraying land with toxic biocides (pesticides, fungicides, insecticides, herbicides, etc.) also kills the microorganisms that help pull carbon into the earth, and the use of antibiotics and chemical wormers in livestock are believed to disrupt those microbes too, via animal dung.⁷

Experts such as Cleijne believe that conventional agriculture, using these techniques, is depleting our soils,



...it could halt the march of climate change...

releasing rather than trapping carbon, and gradually turning living dirt into desert.

Regenerative agriculture

Cleijne is an advocate of ‘regenerative agriculture’, which she describes as “a continuous process” guided by five principles: minimising soil disturbance, keeping the soil surface covered, keeping living roots in the soil, growing diverse crops, and integrating grazing animals into crop rotations.

And these practices work. Of the soils analysed by Lancaster University, nearly half those managed with regenerative strategies had lifespans of over 5,000 years.³

Central to regenerative agriculture is reducing or eliminating tilling, leaving the previous crop on the ground to preserve soil structure.⁸

Different crops cultivate different microbial and animal life, and give the soil different nutrients, so crop variety improves soil biodiversity. This can be achieved by planting non-harvestable ‘cover’ crops specifically for this purpose, planting several different ‘mixed’ crops in one field at the same time, and crop rotation — changing what is grown on

a piece of land over time. Instead of monocropping and leaving soil bare, these methods preserve and regenerate soil.

Nourished soil reduces the need for chemical fertilisers and biocides, because its crops are naturally hardier and more pest-resistant. And farmers can use natural, albeit more labour-intensive solutions: manual weeding; planting crops that encourage pests’ predators — such as ants;⁹ and using livestock to eat away old plant matter and excrete natural fertiliser.

Denman says it’s about “creating those circles and letting it all do its own thing”.



ORGANIC OR REGENERATIVE?

Organic and regenerative farming overlap, but are not the same thing.

Organic produce is grown without the use of chemical fertilisers, pesticides, growth regulators and livestock feed additives. Irradiation and use of genetically modified organisms (GMOs) are also generally prohibited.

Regenerative agriculture focuses on cultivating, nourishing and reviving soil without chemicals.

When studying the nutrient density of crops, the BFA found that organic certification did not indicate better nutritional quality — but regenerative practices did.¹⁰

Unfortunately, regenerative farming doesn’t happen overnight, and the long transition stage will likely see lower yields. Denman says it’s helpful to think about these as techniques that farmers can implement gradually, rather than expecting a total switch.

Healthy soil, food, and us

According to Cleijne, whose area of expertise includes the link between soil and human health, healthier soil also grows healthier food. The more microbial biodiversity there is in the soil, she says, “the more nutrients can be transported from the soil into our crops, making them more nutrient dense”.

Research comparing crops from farms that had used ‘soil-friendly’ practices for at least five years with conventionally-grown crops, appears to support this view. ‘Soil-friendly’ crops were found to contain more minerals, vitamins, phytochemicals and antioxidants, and lower levels of heavy metals.¹¹ Similar findings were reported in 2018 by the *BioNutrient Food Association (BFA)*, which started the Real Food Campaign.

“Buying consciously, reading labels, and knowing where your food is from and how it’s grown makes a huge difference”

The huge variance found in nutrient density for comparable produce across 16 different elements led researchers to conclude that regenerative practices were the best indicator of nutritional quality.¹¹

Cleijne says: “Soil health decline has been shown to correlate with decreased nutrient density in our crops, and therefore we are not getting sufficient macro- and micronutrients in our diets.

“Major studies across the globe show that the nutrient content of fruit and vegetables has decreased significantly over the past decades, reducing the quality of the food we eat.

“All over the world, there’s been a parallel progression of soil health decline and rise in chronic disease.”

Fans of regeneratively-grown produce also say it tastes better. Cleijne says: “If you’ve ever seen a pale-looking tomato, and been unsurprised that it didn’t taste very good, then you’ll understand the correlation between healthier produce and great taste. If a crop is rich in nutrients, it will be healthier, stronger looking and likely to taste better.”

The animal conundrum

Crucial to regenerative farming is how animals are farmed — although it is also a highly contested piece of the puzzle.

Intensive factory farming emits massive quantities of CO₂;¹² and globally, around two thirds of all livestock is factory farmed — the UK alone has an estimated 800 ‘mega farms’, some of which house over a million chickens.^{12,13}

But when used in crop rotations, ruminants such as cows and sheep

— which do emit the greenhouse gas methane — can naturally revive and regenerate soil ready for a new crop. When they are grazed on pasture, their dung acts as potent natural fertiliser, and their hooves aerate the soil and sequester carbon.

Denman says: “Meat consumption in general needs to go down and not be such a big part of the diet... everyone knows that, I think. But having meat production alongside vegetable and fruit and grain production is imperative to producing good methods. In regenerative farming and circular farming, it’s part of what we do.”

Some farms focus solely on regenerative livestock farming. Liz Brunskill’s Berkshire farm has been raising pure-bred Hereford cattle regeneratively for about 20 years. She’s certified with Pasture for Life, which confirms meat has been produced following a range of practices that promote soil regeneration and animal welfare.¹⁴ That means Brunskill’s cattle graze on grasses, herbs, wildflowers, clover, and hay from the farm — never imported feed. They’re not given chemical wormers, and calves stay with their mothers for longer than is usual. Cleijne explains that such practices mean these animals “have a much higher welfare of life”. Plus, she says, a diverse, anti-inflammatory diet nourishes their gut microbiome and ultimately produces healthier, more nutrient-dense meat.

But high-welfare, entirely pasture-fed cattle farming is extremely land intensive; and in mixed farming, the more that animals are kept outside, the more land is swallowed up into agriculture. Studies show this is terrible for biodiversity;¹⁵ and some experts argue that the environmental benefits of rewilding and planting trees would far outweigh the benefits of keeping livestock.¹⁶ Indeed, certifications like Pasture for Life demand a quantity of land and quality of animal welfare incompatible with the mass production of cheap meat.

What you can do

“Buying consciously, reading labels, and knowing where your food is from and how it’s grown, makes a huge difference,” says Denman.

If food is marked with a Red Tractor label, or certified organic by the Soil Association, he says, it has been grown by farmers who are incentivised to

use some regenerative techniques. He believes in the future “there will be biodiversity certifications, and there will be regenerative farming certifications, so look for those assurances”.

One such assurance, just launched, is Healthy People, Healthy Planet, developed by the SKC and My Emissions. Restaurants can use this label to indicate meals that are both healthy and grown sustainably.⁶ Meanwhile, the BFA is developing a nutrient-density tester to enable farmers and consumers to measure the nutrient density of food, and thus soil quality.¹⁰

Buying local, seasonal produce is also a step in the right direction. Denman says consumers should buy food “because it’s a cool product” and work out what to do with it, rather than stick unwaveringly to habits. Buying what’s available helps to stabilise consumer demand, which in turn enables regenerative practices.

Finally, if you eat meat, it is arguably better to buy higher-quality produce, less often, and preferably from a butcher. That way you can ask where the meat has come from, request cheaper cuts rather than compromising on quality, and play a part in lessening the damage of meat production. Better quality meat generally ensures higher animal welfare and produces more nutrient-dense food;¹⁷ it’s better for the planet, for the animal, and for you.

For more information visit:
www.sustainablekitchenconsultants.com
www.pastureforlife.org

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