

OPEN A  
window



Under MY  
FEET

*Open a window under my feet* is inspired by the ways in which microbes, plants, and fungi in soil work together in co-existence.

These organisms are in constant dialogue with each other below ground. Communication takes place through mycorrhizal networks: fungal threads making up underground networks that are found in forests and other plant communities. Through these networks, plants can exchange sugars, nutrients, water and more. Ecosystems stop being collections of individuals, and function more like one large living being, filled with intricacy and reciprocity.

The healthier soil is, the more complex and diverse these underground communities become. Nowadays, numerous farmers are working to build soil health and diversity, having learned about the many benefits for the planet and people. This work is a celebration of these complex, unseen networks, and how they can inspire us to live in communities that reflect similar approaches.



The way society treats soil is not working. Around one third of the world's topsoil is already degraded. The United Nations estimates complete degradation within 60 years if things don't change. Agriculture also accounts for around 20% of global emissions. When combined with forestry and other land use, this rises to 25% of emissions. While mainstream agricultural systems harm soil, there are other options.



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There are 4 billion acres of cultivated farmland, 8 billion acres of pastureland, and 10 billion acres of forest land around the world. We rely on this land to grow food and fibres, support biodiversity, and maintain water security. While agriculture may seem like a large part of the problem, it can also be vital to the solution.

Soil can be built back and we can put carbon back into the ground, where it belongs.



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# Soil Building Benefits:

## CARBON DRAWDOWN

One teaspoon of soil contains more microbes than all of the humans on earth. These microbes work in community with plants growing in soil. Plants pull in carbon dioxide through photosynthesis, transporting the excess into soil where it becomes known as soil organic carbon, the main component of soil organic matter.

This feeds microbes and fungi, and in return they provide plants with hard to access nutrients. It's a perfect balance, with these systems working together in harmony. The healthier the soil, the more carbon the plants pull in for the microbes, and the more CO2 sequestered.



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# Soil Building Benefits:

## CARBON DRAWDOWN

The UN's Food and Agriculture Organisation (FAO) estimate that soils could sequester more than 10% of humanmade CO<sub>2</sub> emissions, but others think it could be higher.

*"Estimates of the total potential impact vary. Rattan Lal of Ohio State University argues that desertified and otherwise degraded soils could sequester up to 3bn tons of carbon per year (equal to 11bn tons of CO<sub>2</sub>, or nearly one third of current emissions). Other experts foresee even greater potential. According to research at the Rodale Institute, if instituted universally, organic regenerative techniques practiced on cultivated land could offset over 40% of global emissions, while practicing them on pasture land could offset 71%.*

*That adds up to land-based CO<sub>2</sub> reduction of over 100% of current emissions – and that doesn't even include reforestation and afforestation, which could offset another 10-15%, according to the Intergovernmental Panel on Climate Change."*  
*(The Guardian, 2015)*





# Soil Building Benefits:



## WATER SECURITY

When water falls on unhealthy soil it can cause erosion and runoff, because the ground can't absorb water as fast as it falls. This can lead to plants drowning, mass flooding, and loss of more topsoil. When precipitation is unstable it can also cause more droughts and desertification.

But, when soil has higher soil organic matter it has more structure and space, meaning it's able to store more water, for a longer time. Each 1% increase in soil organic matter helps soil hold 20,000 gallons more water per acre. This helps farms be more resilient, as well as protecting communities from flooding.



# Soil Building Benefits:

## WATER SECURITY

When water falls onto healthy soil, it also replenishes water systems properly. It moves through healthy soil before filtering underground aquifers. This helps overall water systems maintain health and protects the purity of groundwater.





# Soil Building Benefits:

## BETTER CROPS

The healthier the soil, the more nutrient-dense the food grown. Regenerating soil leads to healthier crops that pass on more nutrients when eaten.

Plus, soil building reduces the need for chemicals like pesticides and herbicides, because when plants have the right nutrients and root systems they build compounds to naturally protect against insects and disease. Think of it like a plant immune system.

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# What soil building looks like: REDUCING CHEMICALS

Regenerative farming dramatically reduces the use of pesticides, herbicides and fertilisers, protecting landworkers as well as people in surrounding areas by reducing exposure to harmful chemicals.

Instead, farmers focus on growing varieties of crops close together to reduce pesticide reliance, as certain plants that repel pests can be included alongside those that entice pollinators. Plus, planting breeds such as white clover that naturally release nitrogen, reducing the need for synthetic nitrogen fertilisers.





# What soil building looks like:

## DIVERSE PLANTING



Different plants also release different carbohydrates (aka carbon) through their roots. The more variety planted in one area, the richer the soil becomes, as various microbes also return different nutrients back to the plants.

Where monocultures create plants that are less healthy, increasing plant diversity in fields results in rich, nutrient dense soils that produce better yields and more resilient plants. Just like an immune system, the more nutrients the plant is getting, the healthier it is going to be and the better it becomes to eat.



# What soil building looks like:

## KEEPING SOIL COVERED

Keeping the soil covered at all times protects it from wind and water erosion, keeps soil temperatures lower, and helps microbes stay safe and fed.

There are a few of ways to do this, including mulching, but strategically planting cover crops is one of the most common techniques. It keeps soil covered, naturally avoids disease and pest problems, and brings more variety to the soil.



# What soil building looks like: CROP ROTATION

Crop rotation is used to avoid planting the same things in the same location endlessly, building up some nutrients in the soil and neglecting others. Rotating crops helps infuse soil with diverse nutrients and build healthy soil organic matter.



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# What soil building looks like:

## NO-TILL

In conventional farming soil is often dug up and left bare. Ploughing and tilling dramatically erode soil, hurts soil microbes and release large amounts of CO<sub>2</sub>.

By adopting low- or no-till practices, farmers reduce physical disturbance of soil as much as possible, instead maintaining soil structure and preventing erosion. In time this leads to increased levels of soil organic matter, which creates more resilient and healthy soil, more carbon held in the ground, and no bare soil to erode and runoff with rainfall.

