

# Dirt to Soil: A Journey Into Regenerative Agriculture

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✓ Fact Checked

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## STORY AT-A-GLANCE

- › The challenge facing most farmers today is that conventional agriculture has decimated the topsoil with tilling and synthetic fertilizers, which disrupt and destroy the microbial life necessary to grow nutrient-dense food
- › Mycorrhizal fungi grow in healthy soils and are responsible for nutrient transfers between plants and soil biology. The most critical thing in a plant's life is its relationship with mycorrhizal fungi, which is why tillage and synthetic chemicals should be avoided
- › The five basic principles for building a healthy soil ecosystem are: not disturbing the soil microbiome, protecting the soil surface with cover crops, diversification, maintaining living roots in the ground as long as possible and integrating livestock and insects
- › For change to occur, farmers must decide they want to change, and consumers must demand nutrient-dense foods produced in a regenerative manner that benefits the ecosystem as a whole
- › The farm program keeps farmers trapped in the conventional model, which destroys soil – an essential resource – and locks them into a monocrop system with dwindling financial returns

Gabe Brown is a pioneer in regenerative land management, a holistic strategy that helps restore soil health. I visited his 5,000-acre farm in Bismarck, North Dakota, on my 63rd birthday. We reviewed many of his techniques in "How to Use Regenerative Farming Principles to Grow Healthier Food in Your Own Garden."

Here, we discuss Brown's book, "[Dirt to Soil: One Family's Journey Into Regenerative Agriculture](#)," which expands on the information discussed in that interview.

Brown's farm, which he runs with his wife and son, was founded by his in-laws in 1956. They were conventional farmers, using tillage, monoculture and synthetic fertilizers and herbicides. Brown and his wife purchased the farm in 1991.

*"I grew up in town, so agriculture was new to me," Brown says. "I had a couple of degrees from North Dakota State University in animal science and agro-economics. I learned the industrialized, commoditized production model. My father-in-law, when we returned here, also taught me those principles.*

*Then what happened ... we'd be tilling the soil and watch the top soil blow away. I was always wanting. I couldn't learn enough. I studied and read Allan Savory's work on holistic planned grazing. I read about no-till. I went down the path of changing our grazing model. I bought a no-till drill.*

*What really changed our lives were four years – 1995 through 1998 – when we lost three crops to devastating hail storms and one crop to a drought. We had four years of basically no cash grain income or no crops to harvest. That put us in pretty dire financial straits. The bank won't loan us money anymore to buy all these expensive inputs.*

*I had to learn, 'How do I take that dirt that I had at that time and make it into productive soil?' That set me on a 25 plus-year journey – I'm still on that journey – of converting dirt to soil. That's how the book came about.*

*That got us to the point where we are today, where a group of us spend the majority of our time traveling around North America, trying to teach other producers to take their operations into their own hands and make a difference by producing truly nutrient-dense foods ...*

*I really think God purposely led me down this path and said, 'OK. I'm showing you this to force you into a different type of production model.' That's the model*

*of regenerative agriculture.*

*I tell people, 'Those four years were the hardest thing we ever could have gone through, but it was absolutely the best thing that could happen to me, because I never would have gone down this path if we had not been a subject to those natural disasters.'*

## **A Different Way of Seeing**

In 1997, Brown met Don Campbell, a rancher from Alberta, Canada. "He said this to me and it stuck with me ever since: 'If you want to make small changes, change the way you do things. But if you want to make major changes, change the way you see things.'"

That made Brown realize he needed to change the way he views soil. It's not just dirt. It's a living, functioning ecosystem. The problem is that most farmers do not treat it as such. He realized that by focusing on what the soil needs to thrive, nutrients are automatically made available to the plants, allowing him to produce nutrient-dense food.

In his book, "Dirt: The Erosion of Civilizations," David Montgomery outlines historical disasters, noting that millions of tons of topsoil erode each year into the Mississippi basin. Globally, some 4 billion tons of this precious resource is lost annually.

The historical precedent is to farm the land until it's used up and then relocate. But we're now getting to the point where there's nowhere left to go. Brown is promoting the transition away from that, teaching ways of optimizing the soil we have.

*"An interesting analogy that I like to give that puts it into perspective for people is if you hold up a sheet of paper, just a newspaper or a book, the thickness of that thin sheet of paper is the equivalent of 1 ton of topsoil per acre. If we have a windy day, if you have bare-tilled soil, you're going to lose a ton of topsoil on an acre of land. That's unacceptable ...*

*What we're trying to enable people to see is the fact that we can stop it. It's just a matter of following nature's principles. Let's work with nature to cover the soil,*

*to have green, growing plants, to cycle that carbon out of the atmosphere and put it back in the soil in that cycle where it belongs. It will lead to the betterment of all society and all ecosystems,"* Brown says.

At present, less than 5% of farmers and ranchers worldwide have adopted these practices, but growth is exponential. Regenerative farming is now doubling every year. "Those of us who are out touting the benefits of regenerative agriculture are overwhelmed with producers who want to make a change," Brown says.

## **The Rural Crisis**

According to Brown, there's a real crisis going on in rural America right now, with suicide rates being at an all-time high among farmers and ranchers. Most are struggling financially as a result of low commodity prices and overproduction of basic commodities, and this crisis is proof positive that the current production model is not working.

*"We're in this production model where it's all about pounds and yield, and it's not about producing truly nutrient-dense foods in a way that can regenerate our ecosystem. We have to change this model,"* he says.

Aside from changing mindsets about how to produce food, Brown is also teaching farmers how to become true entrepreneurs; how to actually get their goods to consumers.

*"One of the things we do on our operation is we have an open-door policy, meaning any person can drive on our ranch at any time and look at anything they want. To me, that's the best.*

*You can have all these labels and standards, but if people see it with their own eyes, if they get to know the farmer or rancher and see what we do, see how we care for our animals, see how we care for the soil, that builds trust.*

*Once they taste the product and their bodies will be satiated – their bodies will know, 'This is good. This is nutrient-dense. I want it,' and then they're a customer for life."*

## **Five Principles of a Healthy Soil Ecosystem**

One of the benefits of the regenerative methods Brown teaches is the retention of moisture. Last year, they got just 5.6 inches of rainfall. But if you focus on the symbiosis between plants and soil, dry spells can be tolerated. To have healthy plants, you need healthy soil, and by viewing the soil as an ecosystem, you can tremendously increase the water holding capacity of the soil.

The key is to concentrate on what the soil needs first, and this is true whether you're working a small backyard garden or a large farm. As explained by Brown, there are five principles of a healthy soil ecosystem. The type of livestock, the equipment and varieties of crops may vary, but the principles remain the same:

- 1. Use the least amount of mechanical or chemical disturbance possible –** Keep tilling to a bare minimum and strive to avoid all synthetic fertilizers, pesticides, herbicides and fungicides.

The more you till, the faster the soil degrades and is destroyed, as it destroys soil aggregates and mycorrhizal fungi, which houses the microorganisms needed for nutrient transfer. Similarly, by adding synthetic nitrogen to the soil, the biology is radically altered – it starts consuming carbon in the soil aggregate, which destroys the soil structure.

And without soil structure water cannot infiltrate, move throughout the soil profile and be stored via organic matter. The soil aggregates also provide the home for soil biology which is critical to producing nutrient dense food.

- 2. Armor the soil surface with living plants –** Forest and prairie land is completely covered with vegetation, and this is the environment farmers need to emulate. That vegetation protects the soil not only from wind and water erosion, but also from

excessive heating and cooling. These living plants are what end up actually "growing" topsoil.

- 3. Have living roots in the soil as long as possible** – This is an extension of armoring with cover crops. Soil is formed from growing plants that take in carbon dioxide (CO<sub>2</sub>) from the atmosphere through photosynthesis, and release it as "liquid carbon" through the roots, depositing it back into the soil, where it attracts microorganisms that ultimately end up providing the plant with all the nutrients it needs to grow.

So, to grow topsoil, you need living roots in the soil for as long as possible throughout the year to keep the carbon cycle going, and to feed the biology in the soil.

- 4. Diversify** – Having a diverse array of plant life is essential, and cover crops fulfill this requirement as well. Home gardens will also benefit from cover crops, helping to improve the soil, attract beneficial insects and capture more sunlight (energy). Brown explains:

*"We'll plant corn, but then along with the corn, there will be vetches, clovers and understory growing underneath that corn. We're not only feeding the soil microorganisms from the root exudates of that corn plant, but also from all these legumes. And then the legumes help take atmospheric nitrogen and provide it to the corn plant.*

*People think those other plants will compete with the corn crop, but nature doesn't work that way. Nature is much more collaborative than competitive.*

*We do the same thing in our garden. We will have a row of sweet corn, but right next to it, we'll have a row of peas, and on the other side, a row of beans. The row may be a monoculture crop, but growing together are all these different species and flowering species attracting all the pollinators and the predator insects.*

*We haven't used pesticide on our ranch in over 20 years. The reason is there's no need to. We have the predator insects that keep the pests in balance. There are 1,700 beneficial species of insects for every species that is a pest."*

- 5. Integrate livestock and other animals, including insects** – Flowering plants that attract pollinators and predator insects will naturally help ward off pests that might otherwise decimate your main crop.

While many believe livestock are contributing to the climate change problem, it's important to realize this is only true for animals raised in **concentrated animal feeding operations** (CAFOs). Allowing animals to graze freely is actually part of the solution.

Centuries ago, large herds of bison and elk moved across the landscape, foraging, depositing manure and trampling vegetation into the ground. All of this is part of the natural cycle that is missing when animals are kept in CAFOs.

As noted by Brown, "If we remove the animals from the ecosystem, we can grow a plant and we can pump some carbon into the soil, but not nearly as much as if we have animals grazing. So that's the two keys: living plants, and then we have to integrate animals again."

CAFO cattle produce methane, which is destructive to ozone, but the reason they produce methane is because they're raised on an unnatural diet of grains, which they're not designed to eat. This unnatural diet alters the gut microbiome in the animals. So, it's the model by which they're being raised that is causing the problem. Brown explains:

*"Methanotrophs are organisms that feed on methane that livestock expel. As an animal is out grazing, these methanotrophs take care of that methane. Well, we don't have that in the feed lots and in confinement. There are no methanotrophs."*

*The other thing is the fossil fuel usage to produce and harvest all of the grains ... It's a tremendous fossil fuel usage that we can get away from if we switch to a more regenerative production model."*

## **Yes, It Is Possible for Animals to Graze Through Winters**

Most people think it's impossible to raise a grass fed animal in the winter, especially in North Dakota, but that's not true. Cattle can be raised on grass anywhere, year-round.

Brown explains:

*"Animals adapt to the environment. Our cattle graze for the majority of the year. In fact, some winters, we're able to literally graze through the whole year without feeding any processed feeds. We do get some major blizzards here. At those times, we're prepared.*

*We put up some forage and hay bales, but we leave them out on the land where that forage was growing. And then our cattle graze on those bales at such time when they can't physically graze grass.*

*By leaving the hay bales out there, the cattle are grazing there. They leave their manure there. The nutrients from the bale are left right there, so it's adding carbon to the ecosystem. It's a process that keeps that land healthy. Carbon is the most limiting factor in production agriculture today. Also, it is much healthier for the animal to be out grazing rather than being confined in a CAFO."*

## **Repopulating the Ecosystem**

Soil is not the only thing that benefits from regenerative land management. Wildlife also diversifies and is augmented. When Brown and his family took over the farm, they never saw deer or pheasants. Sightings of songbirds and grouse were minimal.

Today, he can sit on his porch any evening of the week and count up to 100 deer on his land. Pheasants, hawks, owls, grouse, partridge and myriad songbirds have moved in.



Last year, the Audubon Society did bird surveys on his land and found nesting piping plover, an endangered species of shorebird. They figured that should be impossible, as these birds nest near rivers and beaches, yet the nearest river is 10 miles away.

*"If you build it, they will come," Brown says. "These animals, insects and birds, they all know what's healthy. They know what they need as far as habitat and food to survive. It's a wonderful thing to be able to see all that life on one's farm or ranch.*

*A few years ago, I had one field that was 30 acres of corn, but it was nongenetically modified (GMO) corn, open-pollinated, no synthetics on it, no pesticides, because we just don't use any of that. My neighbor had 600 acres of corn right next to me.*

*Well, every evening, up to 75 deer would walk out of his corn, where they had bedded during the day, walk over half a mile to my field, and that's where they would eat. If that doesn't tell you something, I don't know what does."*

## **How the USDA Farm Program Blocks Progress**

As mentioned, regenerative farming is growing exponentially. It could grow even faster, were it not for the U.S. Department of Agriculture and the current farm program, which subsidizes junk food ingredients. The farm program also offers revenue insurance or crop insurance to farmers, but there are strings attached.

If you want crop insurance and subsidies, you have to use the current production model, meaning you have to grow single crops (monocultures), and production is completely focused on yield. No attention is paid to the impact on the soil or the ecosystem at large.

What's worse, farmers may find it difficult to get a loan unless they take part in this program, and if they do, the program dictates which crops will give them the greatest revenue insurance, meaning guarantee them a certain price.

Needless to say, farmers will grow whatever crop is going to give them the greatest financial return, be it corn, soybeans, cotton or spring wheat. As a result, price is driven down due to overproduction, while simultaneously degrading our soil resources.

*"This is the vortex farmers and ranchers are in. They're stuck in a hamster wheel going nowhere," Brown says. "My book is the story of our journey and what we did to get out of that trap, what we did to take control of our own destiny.*

*Instead of relying on the government to dictate these things, let's be a price maker instead of a price taker. Let's do it in a way that we can regenerate our resources ...*

*The mantra lately for many companies is, 'We want to be sustainable.' I tell farmers and ranchers, 'Why in the world would we want to sustain a degraded resource? We can't afford to be sustainable. We have to be regenerative.' The five principles I share in this book are those that will empower people to be regenerative."*

## **Twofold Change Needed**

As noted by Brown, the change we need is twofold. First, farmers and ranchers must decide to make a change. To help them do that, Brown and his partners at Soil Health Consultants formed the Soil Health Academy.

They travel around the world teaching farmers how to take control of their own destiny. Second, consumers must demand change. You must demand nutrient-dense foods rather than empty calories.

*"Consumers, through their buying dollars, can vote and say, 'Hey, I'm only going to spend my buying dollar at those farms and ranches that are producing nutrient-dense food.' When consumers are educated enough to spend their money that way, that will truly change production agriculture," Brown says.*

*"Now, I'm just going to make a prediction. I talk about the principle of diversity and how people have been growing monoculture cash crops. We're seeing some very exciting things occurring right now with what's called 'polyculture cash crops.'*

*A farmer wouldn't just plant one crop in his field, he'll plant several species together. That creates these synergies, feeding soil biology, cycling more carbon from the atmosphere into the soil, and increases the profitability for the farmer ...*

*I think it's going to grow very quickly. It can't happen soon enough in my book ... And I would like people all over the world to start supporting local. Buy local. Get to know your farmer or rancher."*

## **More Information**

If you're a farmer, you can contact Brown's group, [Soil Health Consultants](#). They recently launched a new website where you can find a lot of information on regenerative agriculture. Also be sure to pick up a copy of Brown's book, "[Dirt to Soil: One Family's Journey Into Regenerative Agriculture](#)," in which you'll learn more about the core principles.

*"Most importantly, there are people using these practices in every country all over the world. Seek them out," Brown says. "One of the things we like to teach people is that this has multiple ramifications. We take carbon out of the atmosphere using regenerative agriculture principles.*

*We hold nutrients on the farms and ranches, instead of having them [contribute to] the dead zone in the Gulf and the problems with the drinking water in the Great Lakes, and the shortage of water in the Southwestern United States.*

*We can heal the water cycle. We can heal the nutrient cycle. We're going to produce more nutrient-dense food. We're going to have a healthier society because of this. This has ramifications across many fronts. We're not talking*

*about simply farmers, ranchers and gardeners here. We're talking about all society ...*

*I encourage people to take it upon themselves. I end my book with a story about a lady in the inner city who called me, asking what she can do to produce healthy, nutrient-dense food for the children in the inner city.*

*I challenge the readers who are reading my book to do something. If you're a consumer, vote with your buying dollar. If you're a farmer or a rancher or a gardener, do something in the practices you use to produce nutrient-dense food. But all of us can make a difference."*