Regenerative Soil Management:
A Special Interview with Gabe Brown
By Dr. Joseph Mercola

DM: Dr. Joseph Mercola
GB: Gabe Brown

DM: High-quality soil is crucial to grow nutrient-dense plants. Tragically, most of our soil is being significantly damaged. Is there a solution? Hi, this is Dr. Mercola, helping you take control of your health. Today I am joined by Gabe Brown, who is a true pioneer in regenerative land management to help restore the soil back to the way it used to be and to stop the absolute decimation that industrial agriculture has implemented on our system.

And you know, we really need healthy soil to grow healthy food. Gabe is truly a pioneer and is taking a lot of arrows in the back for his progressive movements. I’m really grateful that he’s out there leading the charge to help shift agriculture. Thank you so much for what you’ve done and welcome.

GB: Thank you. It’s a pleasure to be with you this morning.

DM: Most people listening probably don’t know who you are. But as I said, you are one of the leaders in this area. Can you give us a bit of your background and how this… Because you were, I think, originally trained as a traditional farmer, like doing even GMO crops maybe. Maybe that predated your time, I don’t know. But why don’t you tell your story because I’m sure it’s fascinating.

GB: I was in the conventional mindset. And then up to not too many years ago, I was using GMOs and I was actually selling some GMO products. Over the years, my thinking has evolved and my holistic management has evolved, where I realized that this is just wrong. It’s not the way that it was intended to be and I need to change how I operate.

We are not… I want to make this point clear: I am not certified organic. Our operation is not certified organic. We still occasionally use herbicide. Now, I don’t use glyphosate at all. I haven’t for a number of years. But I am trying very hard to get to the no-till organic. Unfortunately, at this point in time, I just haven’t figured out how to… It’s the lesser of two evils. Do I use a herbicide pass once every two to three years or do I till?

DM: Or the cover crop.

GB: It’s very difficult. We’ve tried the crop roller that can be done further south. I had one custom built. I tried that for a number of years. Our growing season is so short that I’m not able to get a cover crop in pieces or in other words, to the point where rolling that down will kill it and still get a cash crop. I do not use any herbicides on post-emergent – in other words, on crops that are growing.

The only time we’ll use it is a little bit on what’s called pre-emergent, before we seed the crop. If I don’t have that armor on the surface, that will prevent weed growth. And see, we found that if we can get that cover crop tall enough to have enough biomass, we’re actually able to go two to three years without a herbicide pass.
We’re working on it. We’re trying hard. At this point, it becomes a balancing act. Do I want to till? I haven’t tilled my soil since 1993, so you know the answer to that. Or am I going to use a herbicide every two to three years?

**DM:** Yeah. The lesser of two evils, it sounds like.

**GB:** That’s right.

**DM:** I mean, the other option is to pick up your land and move it about a few hundred miles south.

**GB:** Right. But then I won’t have these beautiful winters. Okay. Well, I grew up in town. I was not born and raised on a farm or ranch. But I had the good fortune of falling in love with a young lady whose parents had a farm. They had bought the ranch that we’re on. They had purchased it in 1956 and they farmed it until 1991. At that time, my wife and I purchased the operation and we started farming conventionally. It was heavy tillage, all small grains, and season-long grazing with the livestock.

Not being from a farm or ranch, I always tended to question why we do certain things and why things were done in a certain way. I had listened and attended a class that Alan Savory put on, talking about rotational grazing. I started doing some rotational grazing. Then in 1993, I had friend in the northern part of North Dakota who was a no-tiller. That friend convinced me into going no-till.

I’ll never forget my father-in-law had told me once. He said, “You’ll find that the more we till the soil, the better it is.” I often questioned that because we’re in an area where we get approximately 16 inches of total precipitation a year. Moisture is usually a limiting factor. Well, I couldn’t understand why we tilled it and dried it out. In 1993, I went 100 percent no-till. I sold all my tillage equipment and went no-till. Immediately, we started seeing some benefits from the fact that we didn’t till the soil. We were conserving moisture.

**DM:** Can we stop right there? Because I think that’s such a crucial and important topic and I’d like your perspective. Do you think that tilling the soil is one of the most damaging things that industrial agriculture’s doing to the soil?

**GB:** Well, it’s certainly one of them. There are five basic tenets of regenerating our resources, our soil resources, and number one has to be tillage. Now, I realized that a lot of the organic producers are going to do some tillage. But I tell them, “At least minimize your tillage. Do it in the least amount possible,” because we have to provide a home for that soil biology. And when you till, you disrupt their home.

**DM:** It just occurred to me. There may be a lot of non-farmers viewing this. Why don’t you describe what tillage is?

**GB:** Well, tillage is the act of taking either a plow, a chisel plow, a field cultivator, or any type of steel or implement and destroying the soil’s structure and turning the soil over. By reducing the tillage, we leave those soil aggregates, those pore spaces intact, which improve water infiltration and then also provide that home for that soil biology.

**DM:** Yeah. And how did that get started? Would you say that this is the pervasive way of farming today? Or is there a trend towards no-till?

**GB:** Well, I will give you an example. When I started no-tilling in 1993, I was the lone no-tiller in Burleigh County, North Dakota. Burleigh County is a million-acre county of which approximately 60 percent is farmland. I was the only no-tiller. Now, today, approximately 70 percent of the farm ground in this county is no-till. It’s really caught on here in the Northern Plains, especially where moisture is a limiting factor.
DM: Well, that’s good. You probably have a little bit to do with that I would imagine.

GB: I’m not going to take the credit for that one. There are a lot of players involved in that.

DM: That’s good. Do you think it’s the same across other parts of the country?

GB: Well, across the Upper Midwest and through the Great Plains, it definitely is. Although we’re seeing with these various temperature and moisture conditions – wide swings we’re getting lately – it seems that there is actually movement back towards more tillage, which only compounds the problem. Because the more you till, the more you destroy infiltration pores. You’re only going to compound the problem for your future.

DM: Okay. I’m sorry, I interrupted you. If you can continue your story of how you made the transition to no-till.

GB: Sure. We started no-tilling in 1993. At that time, we had very little diversity. I just want to make a point right away that when I started, I had no idea what soil health was. But then, through the grace of God, I went through a period of four years from 1995… In 1995, the day before we were going to start combining our spring wheat crop, we lost 100 percent of that crop to hail. That was pretty devastating on a young family starting out. What do you do after hail? You lose your feedstock. I started planting some cover crops. At that time, I didn’t call them cover crops. I was just trying to provide some feed for my livestock.

Then 1996 came along and we lost 100 percent of our crops to hail again. I started planting more of these cover crops. Now, I wasn’t able to borrow money anymore for synthetic inputs – fertilizers, etc. I had to figure out how do I get the soil to be productive on its own? I started planting more legumes, things like peas, and then I came across hairy vetch. I started hairy vetch as a legume. It’s a fall-seeded biannual. I planted that with winter triticale in order to provide some great-seeding feed for the livestock. I started to diversify the crop rotation, which was really an important step in teaching me the importance of diversity.

And 1997 came along and we dried out. Nobody combined an acre. It was a devastating drought in this area, from North Dakota. We had three crop failures in a row. But I started to slowly notice that there was an improvement in my soil. It was mellower. It smelled better. We were starting to see earthworms. When I took over this place in 1991, we never had a single earthworm in any of the fields because of the heavy tilling.

Anyway, to make the long story even longer, 1998 came along, and we lost 80 percent of our crop to hail. We had four devastating years of crop failure in a row. I tell people that’s the best thing that ever could have happened to me, because it taught me that I had to learn how to take care of the resource.

When we started, we did soil tests on our land like most farmers do. They test the soil every year to see what nutrients are in there. Our organic matter levels were 1.7 to 1.9 percent. Well, historically, you look at the Northern Plains’ organic matter levels, National Rivers and Streams Assessment (NRSA) scientists can tell, were probably in that seven to eight percent range back 200 years ago. We have degraded all 75 percent of the organic matter in our soil. That’s common in conventional agriculture.

I tell people, you know. One of the buzz words today is “sustainable.” Everybody wants to be sustainable. My question is why in the world would we want to sustain a degraded resource? My operation today is still degraded. We need to be regenerative. We need to work on regenerating our soils, not just sustaining a degraded resource.
DM: Yeah. Thank you for that and for sharing your personal history, especially the illustration of... I think one of the most profoundly important life principles is that every one of us is going to go through the challenges in life. That’s inevitable. There’s just no way out of it. It really is all about your perspective. If you can embrace that challenge and say, “It’s the best thing that ever happened to me and I know that there’s some ultimate good out of it,” it can turn your whole life around as it did for you. I mean, because a lot of people would be devastated. With the four crops decimated by hail, they would just give it up and find a different occupation.

GB: Yeah. My wife was really questioning her choice of husband after four years of crop failures. But she would tell you now, too. It really changed the way we operate. And my thought process grew. I was very fortunate that we have a local district conservationist with the USDA Natural Resources Conservation Service (NRCS), Jay Fuhrer, who took an interest in what he was seeing on our place and helped me learn. He and I learned together the importance of soil health and how we’d rebuild this soil.

I mentioned that our organic matter levels were 1.7 to 1.9 percent. Now, last summer, we tested those same fields again. We were from 5.3 to 6.1 percent. We’ve been able to triple the amount of organic matter in our soil. I mentioned how there was no earthworms when we started. This past spring, my son did earthworm counts in our cropland. In a 12”x12”x2” slice of soil, we were averaging over 60. That’s considerable when you start with zero. That’s just the earthworms. It doesn’t count the myriad of other billions of soil organisms that are also in there.

DM: But they’re a good marker for soil quality. There’s no question. Maybe we can just take a little tangent here, because it’s such an important component of soil health, the earthworms. It’s my understanding that they were never indigenous to North America. They grow from Europe. But they just are magnificent regeneration tools for the soil as long as you’ve got them there. Maybe you can review some of the earthworm benefits, because they’re just a great marker, easy to find. If you don’t have earthworms in your soil, you better start thinking. And if you want to have healthy plants, you better start rethinking things.

GB: That’s exactly right. There are a lot of benefits that earthworms bring. Obviously, the channels that they make are very nutrient-dense. Earthworms, their castings and their secretions, are very nutrient-dense. When you grow a crop in a soil that’s full of earthworms, those plants are going to follow the roots and are going to follow those channels that those earthworms make, and the nutrients will be supplied to the plant.

The other thing it does that we don’t often talk about is improve water infiltration. When we took over this operation, we could only infiltrate a half of an inch of rainfall per hour. In other words, if we had a rainfall event of an inch, over half of it was going to run off. When you’re in a limited-moisture environment, you want all that rainfall to be captured and go into the soil.

Well, now, in the last test we’ve done, we can now infiltrate over eight inches of rainfall per hour, which is huge. I’ve never seen an eight-inch rainfall event in an hour here in North Dakota. But whatever rainfall comes, we’re going to be able to store it and sequester it. There are tremendous benefits to having biology in the soil.

DM: Yeah. And the other thing they do is, you know. Clearly compost is an important component of healthy soil. Vermicompost or the compost produced by earthworms is one of the best compost you could get. But the cool thing is that once you have the density of earthworms that you described, you are literally producing tons, many, many tons – 10, 20, 30 tons – of vermicompost per acre in your soil and you don’t even have to move it. It’s done for free.
GB: That’s exactly right. And the beauty of it is as we move into these very diverse cropping systems and integrate cover crops into them, we actually, on our operation, plant cover crops to benefit soil life and to feed those earthworms. The cover crops become the compost that the earthworm cycle into usable plant nutrients.

DM: Yeah. Why don’t you go over that? Because these cocktail of cover crops that you’ve incorporated into your land management system are a really important part of the equation.

GB: When I started there during those years of hail, we were growing mostly monoculture or two-species cover crops like I mentioned earlier, triticale and hairy vetch or we would plant sudangrass and cowpeas. But then in 2006, I had the opportunity to listen to Dr. Ademir Calegari from Brazil. Dr. Calegari is probably the world’s foremost authority on cover crops. Dr. Calegari made the statement that cover crops need to be seeded in multispecies combination.

It occurred to me… I was really upset with myself that I hadn’t thought of it earlier. Because what I’m trying to do in my operation is mimic native range with the diversity of plant life and the diversity of wildlife, insects, etc. Well, that’s what we’re really doing with the cover crop combination, the cover crop cocktail: plant these multispecies mixes. Today, when I see the cover crop, I’m not going there with 15, 20, 25 different species. I plant mixes up to 70 different species in a mix. What we’re trying to do is mimic the diversity in nature.

Think of it this way. If you plant a monoculture crop, that soil life is only being fed one root exudate. That’s it. But if I plant a multispecies with 20 different species in it, that soil life is being fed the root exudates from 20 different plants. In other words, I’m accelerating biological time. We’re able to regenerate soils much, much faster than scientists used to think were possible.

DM: What have you been able to observe in the processes that you’ve implemented? How much topsoil are you able to produce in a year or five years?

GB: I really think it is not out of the realm of possibility to add an inch of topsoil in a five-year period if we use… Now, the important thing is you have to use these five tenets. You have to be no-tillage. You have to eliminate tillage. You have to keep armor on the soil surface because it’s that armor that protects the surface from temperature extremes and from erosion, and it’s that armor that feeds the microorganisms. You have to have a living root in the soil at all times.

DM: But let’s stop there, with the armor on the soil, because I think that’s a crucial, crucial component. It’s actually one I embraced for residential gardeners, which is the wood chips. But how do you do it in a larger commercial operation? We’ll talk about the size of your farm, which is 5,000 acres. But how do you do it in a commercial-sized arrangement?

GB: Yeah. How we do that is we grow cover crops. We try and grow cover crops on every acre of our cropland every year. Now, those cover crops may be before a cash crop, along with a cash crop, or after a cash crop. But it’s those cover crops that are providing the carbon that becomes the armor on the soil surface.

Also, we’re not removing so many… Producers they’ll combine the cash crop, then they’ll bale the straw, and haul it away. Now, you see the cellulosic ethanol where they’re going to bale all the corn stover and haul it away. That’s just going to accelerate the degradation of our soil resource. You grow these cover crops to keep that armor on the soil surface.

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DM: How does that look like? Do they just die normally and then fall over and that covers it when the winter comes? Or do you actually have to cut it and do that? How does it work?

GB: No. We leave it. That’s a great question. We leave it. As part of our integration, another one of the five principles is livestock integration. With much of our land, we will allow the livestock to run on those fields and graze. We only graze about a third of the above ground biomass. The other two-thirds are trampled by the livestock. Now, in the Northern Plains here, we tend to get a lot of snow. The snow will also cause it to fall down on the surface.

Even if you don’t have livestock, which is an important tool, you still need to be doing cover-cropping because you need to have that living root producing those exudates, putting armor on the surface. What will happen is as your soil gets healthier and has that biology, that plant will fall down and break down quicker, and then the biology will compost it through and convert it into usable forms for the plant.

DM: Yeah. I suspect another part of that armor, especially in frigid environments like North Dakota where your winter temperature’s really dropping, is that cover crop is actually acting as an insulation. The soil doesn’t get as cold, the microbes are able to last longer, and you get more microbial activity.

GB: That’s a great point. I used to think where I’m at, the last chilling frost in the spring, it usually occurs around May 10, the first one in the fall about September 10. I thought that short 120-day window was our growing season. Now, we can easily have crops come out of dormancy in March and then we can keep things growing usually up until Thanksgiving. Because that soil is so alive, the soil biology heats up the soil and we’re able to extend the growing season. The longer growing season we have, the more we can produce and the more that’s there’s to feed soil life.

DM: Let’s discuss the integration of the livestock, because I think it’s an important point. I’ve read a number of books that suggest that to do organic farming, it’s hard to do more than 50 acres for one farm to do it well. You’ve got literally a hundred times more than that. How would you address that and how is it integrated? I suspect that… Maybe my memory is incorrect and it really wasn’t stated as I mentioned. But I suspect it wasn’t integrating livestock into the equation.

GB: Well, our operation is 5,000 acres. Of that, there are about 2,000 acres of true native prairie, which has never been broken or mechanically tilled and which will never be if I have anything to say about it. There’s another thousand acres that is what we call tame grass pastures, which was at one time tilled and it’s been seeded back into perennial species. Many other 2,000 acres is cropland.

What we try and do in our operation is we have 350 cow-calf pairs and then we run between 400 and 800 yearlings and grass-finished beef cattle. But we also have a flock of sheep. We have pastured hogs. We have pastured laying hens and pastured broilers. Our goal is to get these livestock over as many of these acres as possible to integrate them. And besides that, I’m not counting the huge amount, the large numbers of wildlife, insects, etc. we have on our operation, because they all play an important part of the ecosystem. What we’ve found is the healthiest soils on our operation are those where we integrate a lot of diversity of plant species but also diversity of livestock.

So many producers think that, “Well, I’m a no-tiller. I’ve got good soil health.” No-till is just one step. Cover crops are another step. Livestock integration is another step. We keep advancing soil health as we mimic nature further.

DM: Yeah. And an important subset of cover crops is the armor on the soil, because you can grow cover crops and cut them off.

GB: Yes.
DM: And then you don’t have the armor. I think that’s really the essential part of the cover crop. It’s to keep them on the land and integrate them back into the soil.

GB: That’s a great point. One of the things we’re doing in our operation is we do not mechanically harvest those cover crops and put out hay. What we prefer to do is... Livestock have four legs for a reason; make them use them. Our cattle are out there in the winter grazing. They would much rather be out on the land than be locked up in a corral. It’s much healthier for them. It’s healthier for the environment.

I really see problems with the way the current production model is headed. We’re down this path where we’re just degrading the resource. We’re mechanically harvesting all the biomass off of this cropland and then we’re hauling it to feed the cattle in feedlots. It just doesn’t make sense. And then we’re hauling all that manure we have to contend with, which is another problem with what do you do with that waste material and how do you get it back onto the land.

DM: And the urine...

GB: Livestock are meant to graze; let’s have them out there grazing.

DM: Yeah. And the urine, too, which is probably even more volume-wise. That’s basically nitrogen. We’re throwing it away and wasting it when it’s not integrated into the soil. It’s definitely a massive problem.

GB: You know, we haven’t used any synthetic fertilizers on our operation since 2008. The reason is when you build quality soils that are healthy and biologically active, they’re going to supply the nutrients you need. And then when we have the livestock out on the land with the dung and the urine, there’s no reason for me to write those checks. We have a saying in our operation, “We want to sign the back of the check and not the front.”

DM: I couldn’t agree more. Most people don’t realize that the majority of the air that we breathe is nitrogen. If you’ve got good soil microbes, you can extract that out there. There’s no question. And then the converse of that is using these synthetic fertilizers that most farmers are using, I mean, they’re the kiss of death.

GB: Absolutely.

DM: You’ll get initial results, but they’re salts, which kill the soil microbiology.

GB: You’re exactly right. It was just announced yesterday that Cenex Harvest States is going to be building a three billion-dollar nitrogen fertilizer plant 90 miles from my house. I thought about that and I believe the figure is approximately 34,000 tons of atmospheric nitrogen above every acre in the world. Well, if there’s that much atmospheric nitrogen out there, all we have to do is plant legumes to convert that into nitrogen that plants can use. But instead we’re going to spend billions of dollars building plants and then burning all the fossil fuels to haul that fertilizer and put them on the soil, which, you’re right, will only degrade soil life. What kind of sense does that make?

DM: It’s nonsense. It’s really a prescription for disaster and it’s absolutely non-sustainable. If we continue this craziness, we’re not going to have high-quality, nutrient-dense food to eat. The subsequent obvious results of that which is, why I’m so passionate about it, is that the health will go down dramatically in direct proportion to the quality of the food.

GB: Well, you know this better than me. But the last figures I heard is that the United States of America is now the 42nd healthiest country in the world. We’re first in cancer, autoimmune diseases, attention-
deficit disorder (ADD), attention-deficit hyperactivity disorder (ADHD), Parkinson’s, Alzheimer’s, and obesity. Why is that? We’re degrading our resource so much that we no longer have the nutrient density in our foods in order for people to get healthy diets.

Now, I realize there are a lot of other factors that come into play – people’s lifestyles, etc. But as a producer, I challenge my fellow producers. Aren’t we all partially responsible for that as producer? The American consumer should not be buying our product anymore if we can’t provide nutrient-dense foods. The nutrient density of our foods has decreased anywhere from 15 to 65 percent for the last 40 years. That’s uncalled for. It can’t continue or we’re going to have an epidemic like we’ve never seen before, which we’re probably already having in this country.

DM: Yeah, we’re in the middle of it. As you’ve mentioned earlier, you have 5,000 acres that you’re – well, not all cultivating. But I’m wondering if you could describe, because you teach these principles, how you recommend that smaller farmers with 5-, 10-, or 20-acre parcels are able to integrate these principles.

GB: I travel all over North America and other countries, talking about this. I often make that statement because needless to say, I’m met with skepticism in a lot of the places I go to. But I tell people, I will bet our ranch against their operation that I can get the principles that I’m using to work there. The reason I am so confident of that is that those are the principles of nature – no-till, diversity, armor on the soil surface, a living root in the ground as long as possible throughout the year, and livestock integration. Those are simple principles of nature. I haven’t found anywhere in the world that this doesn’t work, where there’s production agriculture obviously.

DM: Yeah, and you’re doing it in one of the harshest environments that’s really commercially practical. I mean, there are obviously more severe ones but not many.

GB: Yeah. Now, as far as the size, my son and I have had this conversation many times because don’t own all 5,000 of these acres. We’re actually located in city jurisdiction, the city of Bismarck which is one of the fastest-growing metropolitan areas in the country. We know that some of the land we run will be taken over for development fairly soon.

We often ask ourselves, “How many acres do we need to support a family?” We honestly believe, in our environment, 160 acres is a great plenty. Even in our environment where our growing season is so much shorter because… Well, I’ll put it to you this way. I attended a conference a couple of years ago. The theme of the conference is “How Do We Feed Nine Billion People by the Year 2050?” I got up there and I said, “That is absolutely no problem.”

DM: Yes.

GB: People kind of… They were taken aback a little bit. But I said, “It’s no problem if we change our production model,” because our production model now is one of monoculture. But if you farm and ranch in nature’s image and start vertically stacking these enterprises… Look at our operation. We grow cash crops, a diverse number of cash crops. We grow cover crops. We’ve got beef, cattle, sheep, hogs, and chickens. I haven’t even began to talk about we allow beekeepers to come onto our land. There’s a myriad of other potential income streams and enterprises that we can stack.

Feeding the world is absolutely no problem if we change the production model. For the small producers, it’s simply a matter of stacking enterprises. Once you do that, you’ll find that not only will you have more income streams to make your operation more viable, but you’ll actually regenerate the soils much, much quicker.
DM: You’re one of the teachers and the leaders in this area and you’ve been doing it for a while. I’m wondering what your observation is on the reception to this information and people actually adopting, incorporating, and making changes. What is your perspective on the current state of the industry?

GB: For the past 10 years, I’ve been pretty much spending all of my winters travelling, trying to get others, and making them aware of these principles. I was met with a lot of hesitation. There was a very small amount that really grasped it and ran with it. I’ve seen in the last couple of years, substantial increase, much of the thanks due to NRCS and the work they have done.

But I’ve come to the realization that I’m not going to be able to make big strides and there won’t be a big adoption of these practices unless we change the current farm program. Because the current farm program is geared strictly to a monoculture production. It’s driven by big business because they want to sell inputs. I’ve come to the realization that we need to educate the consumers and the consumers need to drive the change through their purchasing dollars. If the consumers go to their local stores and say, “I want to purchase food that’s grown on soils that are being regenerated,” and then change will come about. I think that’s going to have to happen before we see a widespread change.

DM: I agree. In principle, it seems to make a lot of sense. And actually, we’re seeing massive success in the GMO labeling movement. In fact, the “Non-GMO” label is actually more desired than the “Organic” label.

GB: It’s funny you mentioned that because one of the enterprises that my son and I are involved with is we’re now direct marketing all of our grass-finished products that we’re producing. The number one question we get asked is, “Where are you located?” Because people want to buy local. The second most-often-asked question we get is, “Are you non-GMO?” It’s not that we’re organic or not. It’s, “Are you non-GMO?” That’s the second most-asked question.

DM: And I’ll tell you, I can know very clearly why that happens. It’s because we’ve really focused and concentrated on labeling GMOs and we lost in the two major states where we’ve initiated. We lost the vote, but we’re winning the war because we’re educating people and they’re making a difference. Ultimately, it’s their dollars, their informed choices that are going to make the difference.

GB: You’re exactly right. Let me tell you this movement. North Dakota, we’re about as segregated as you can get from the coast, obviously. People think North Dakota’s an agriculture state, which it is. There’s a lot of agriculture production here in North Dakota.

But my son and I started this business in March, and we have zero advertising dollars. We haven’t advertised at all. We’ve just been going to local farmers’ markets. We’re already over 650 repeat customers, just opening this business in March. The demand is – we can’t keep up with the demand right now. That goes to show you that if that’s happening in a rural estate such as North Dakota, what’s happening in more urban areas?

DM: I couldn’t agree more. I’m curious. There’s sort of an accepted standard of what a non-GMO is. But is there a similar or comparable label for food or crops grown on regenerative land? I mean, it seems to me that would be the key here. We could get a similar movement going as with non-GMO.

GB: Yes. I think that at the current time, I’m not aware of one. There’s been some talk around the industry, what do you call it. One of the hesitations I have is that I really don’t want the oversight that comes with an organic label. I don’t want, as a producer, someone telling me, “Okay, these are all the stipulations that have to be met.” I prefer to make the one-on-one connection with the consumer.

We have an open-door policy on our ranch. Anytime anyone wants to come and visit us, they’re more than welcome to do that. We have nothing to hide. I’ll gladly show them what we’re doing. But how do
we put a label on that? I think as we move towards more local foods, it becomes the individual producer’s choice as to how they want to portray their operation.

**DM:** But it seems like some of the leaders in this area could get together and agree upon some standards, not necessarily an overseeing committee to enforce it but, you know, these are the standards, you know sort of a… I can’t think of a term now. But you’re doing it on your own honesty.

**GB:** Yeah. It will be some type of regenerative standard as to what is it doing for the resource.

**DM:** Right.

**GB:** Are you no-till or minimum-till? Are you keeping armor or diversity and leaving root in the ground as long as possible? Are you integrating livestock to the point where we’re sequestering more carbon and we’re able regenerate our resources?

**DM:** Yeah. I think it’s a pretty simple process. People can easily understand that. If they want, if they’re buying locally, they can visit the farm.

**GB:** Right.

**DM:** It’s simple to observe. It’s easily self-enforced. You don’t need any large, expensive, overwriting agencies to oversee this. So, one of my new passions is to inspire, encourage, and educate individuals how to apply most of these principles in their own backyard or in their own garden. The challenge is, of course, that most soil in people's backyard is degenerated. They stripped the topsoil off, they put that house in there, and they got really nothing that grows well.

They have to apply these regenerative principles. Probably the most important one, at least in my view, in a residential garden, would be that armor on the soil. That’s the key. Getting that good soil and then growing your own garden, then we get back to Pre-World War II where we have victory gardens and 40 percent of the crops are grown in people's backyards.

**GB:** Yeah. And it should be that way. The beauty of it is we can do that with small areas. We can do it rapidly. The first thing is we don’t disturb that soil. Don’t till it. Don’t turn it over. The second thing is you can get a little bit of cover crop seed. This can be as easy as… And I’ll say this. They can go buy some mixed bird seed and put it out there as cover crop seed on the garden later in the year when they’re done producing vegetables and grow a cover crop. The next year, that will just… They can just lay it down either mechanically, you know, just push something it over to knock it down. But you have that kind of diversity.

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And then one of the things I would highly recommend that they do is to get some wood chips because that’s carbon. Most soils are going to be fungal-dominant. You need the carbon. Get some wood chips and put it over the soil to increase the fungal component in the soil. Get that mycorrhizal fungi working and then plant a very diverse garden. Most gardeners I’ve worked with, in a matter of three years, night and day difference on their soils. Night and day.

**DM:** I couldn’t agree more. I think wood chips are a crucial part of the equation for the residential gardener. It’s a wasted resource in most communities. The tree services they actually have to pay to dump it in a landfill, which generates methane and other carbon dioxide (CO₂) gasses that are nasty. You could easily integrate that carbon. One of the things I’m learning and appreciating, as you well know, is all about the carbon.
GB: Yup.

DM: Which is an organic matter. You’ve got to increase the carbon content. It feeds the microbes.

GB: You know, I tell the farmers and ranchers who I talk to that carbon drives profitability of an operation. We have to start thinking of our farms and ranches as ecosystems and these ecosystems are driven by carbon. The more biomass you produce and the more diversity, the more carbon.

Obviously, trees are a little bit scarce here in the Northern Plains. But for the average gardener, there’s usually some type of tree removal service that has wood chips available in most communities that you can get and add to that garden. If you’re adding carbon, you’re going to increase the fungal component and you’re going to increase the mycorrhizal fungi. Mycorrhizal fungi, of course, secrete glomalin, which starts the formation of soil particles.

DM: Yeah, I couldn’t agree more. I’m in the process of converting… I got less than an acre in my home. I’m converting most of the ornamental shrubs into edible shrubs. I’ve already put about 100,000 pounds of wood chips on and I’m seeking to get another 100,000 pounds or maybe a quarter million total to really integrate that carbon into the soil and then produce. And then you’ve got food that you just go out and harvest. It’s really one of the central, most important principles to saying healthy, if you can harvest healthy food.

GB: Right. Once they taste that food, true nutrient-dense food… I honestly believe that the majority of consumers in the United States have not tasted nutrient-dense food. Because you can smell it, you can feel the difference, and you can taste the difference. Your body knows the minute you bite into a food stuff that’s nutrient-dense, and it’ll react positively to that.

DM: Yeah. It’s really… I think anyone who’s passionate about health ultimately winds up to this conclusion that you’ve got to fix the soil, so you can grow your own food.

GB: Absolutely.

DM: I mean, that’s the only logical conclusion.

GB: You know, and we’re down this path. There’s a great book out there by Dr. David Montgomery called Dirt: The Erosion of Civilizations. Dr. Montgomery talks about how all the civilizations such as the Incas and the Romans, their rise and fall occurred because of the degradation of our soil resource. I had the opportunity to visit one on one with Dr. Montgomery this past year. I asked him, I said, “How long do we have as a nation before this occurs to us?” And without blinking an eye, he said, “Less than 50 years.” He said, “We cannot continue on this path of degrading our resources like we have.”

Look what we’re seeing. Look what happened in Ohio with the Great Lakes and the problem they had with the drinking water. Looked what happened in the Gulf. We’re seeing it all over. The answer under this current production model is, “Let’s just keep adding more and more inputs.” Well, we’re just leading up to our demise.

DM: Yeah, you’re just accelerating it. There’s no question. Thankfully and fortunately, we have resources and we’ll have more resources, the Internet being one of the most useful ones. We’ve already seen how in a relatively short amount of time, literally two or three years, we’ve made “Non-GMO” a more important label than “Organic.” It wouldn’t that much effort in educating and convincing a core group of people to go for this regenerative land component. It’s the next phase, the obvious next phase. Because non-GMO is important, but really, it’s only one element of it. I mean, that’s a subset of regenerative soil management.
GB: Yup. That’s exactly right. They’re all just pieces of the puzzle, just like no-till is a piece; cover-cropping is a piece; diversity is a piece; and livestock integration is a piece. We have to bring all of these things together.

Non-GMO. It just boggles my mind how large business has agriculture bound so tight that it’s stuck in this production model. Look at fungicide use, for example. I’m getting off the subject a little bit. But fungicide use has just accelerated in production agriculture. Well, why do we have more fungal diseases? What’s important is what does a plant need to ward off fungal diseases? It needs zinc, manganese, copper – all of these trace minerals.

Why don’t we have those trace minerals available? Because most of the herbicides we’re using today, including glyphosate, are heavy metal chelators. They tie up those nutrients, so they’re no longer available to the plants. We get fungal diseases and then we end up spraying all these fungicides. We spiral on degradation down further. It makes no sense, this production model. I don’t care whether we’re talking on a garden scale or we’re talking large-term production agriculture. We have to get back to the basics of regenerating our soil resources.

DM: Yeah. And it does great things for the environment, too. I mean, you’re not polluting the water. You’re saving the water and putting it where it’s supposed to be. You’re sequestering carbon into the soil, so it’s not going into the atmosphere. It’s just all around good.

GB: Yeah, without a doubt.

DM: All right. Well, are there any other closing comments you’d like to make or reinforce in what you’ve already said?

GB: Well, I would encourage everyone out there. If you’re a homeowner and you have the opportunity, this can be done on a small plot of land, as small as 5’x5’. The diversity and no-till. Start a no-till garden. Along with that, plant some pollinator species to provide a habitat for pollinators. If you’re a large producer, this can easily be done large-scale.

But most importantly, as a consumer, use your dollars to drive change. Educate others as to the importance of nutrient-dense food. We’re spending more money on healthcare than any other country, but look what it’s gotten us. We need to move and start thinking of food as health. Food is preventative medicine. Let’s drive change and make sure we have healthy, nutrient-dense foods for our citizens.

DM: Yes. I couldn’t agree more. I really thank you for all your efforts, your tenacity, and your embracing hardship as a motivating factor to change your ways and really integrate and apply these concepts and be a real leader and pioneer in teaching other people these important principles.

GB: Oh, thank you. It’s been a pleasure visiting with you.

DM: Yeah. I look forward to seeing you in person. I’m sure you’ll be at the Acres in Columbus.

GB: I think I will be. I was asked to do a one-day workshop on soil regeneration. I’m taking the place of Neil Dennis, who is having some health issues.

DM: All right. Well, I look forward to seeing you out there.

GB: Okay. Thank you.

DM: All right. Thanks for all you do.