

## **Sample Grant Application: Row Crop Operation**

### **Maryland's 2024 Healthy Soils Competitive Fund**

My wife, and I live and farm in Snow Hill, MD. I come from a long line of farmers, and it runs deep in my blood. After graduating from high school, the only thing I wanted to do was farm. I worked alongside my Dad for several years. After some time, I rented land for crops and chicken houses and did that on my own. I married my lovely wife in 2019 and when Dad decided to retire in 2020, and I committed to buying the 120 acre home farm. At the same time, my brother quit his current job so he could work with me on the farm. He took over the two chicken houses on the home farm and all our Dad's 350 acres of rented land.

When folks ask what all and I raise on our farm, I usually respond by saying “ we live on an Old McDonald farm.” We enjoy diversity! On our farm we run three commercial chicken houses, farm 398 acres of land where we grow corn and soybeans as a cash crop, and raise beef cattle and hogs. In 2020, began growing fruits and vegetables on 3-4 acres. She set up a produce stand at the edge of the driveway to direct market fruits, vegetables, and meat right from our farm. It has also brought life to our dream of opening our farm up to our community. To learn more of our story visit our website.

### **Crop Farming**

We have been growing cover crops for years with the help of Maryland's Cover Crop Program. Typically, we have just put out the cheapest, easiest seed we can find or grow ourselves, and use that as our cover crop; usually wheat or barley. Over the last couple years and I have been doing a lot of research on soil health. We have spent many hours listening to the Regenerative Agriculture Podcast that a friend told us about. That podcast really got us excited about farming in a way that regenerates the soil and serves the environment. We have read books like: “Dirt To Soil” by Gabe Brown and “Managing Cover Crops Profitably and Building Soils for Better Crops” by Fred Magdoff and Harold Vanes. These, and other resources, have opened our eyes to a whole new approach to farming.

The following 5 principles are from Gabe Brown's book "Dirt to Soil," and they have impacted our thinking the most this last year.

## The five principles of soil health are:

1. **Limited disturbance.** Limit mechanical, chemical, and physical disturbance of soil. Tillage destroys soil structure. It is constantly tearing apart the "house" that nature builds to protect the living organisms in the soil that create natural soil fertility. Soil structure includes aggregates and pore spaces (openings that allow water to infiltrate the soil). **The result of tillage is soil erosion, the wasting of a precious natural resource.** Synthetic fertilizers, herbicides, pesticides, and fungicides all have negative impacts on life in the soil as well.
2. **Armor.** Keep soil covered at all times. This is a critical step toward rebuilding soil health. Bare soil is an anomaly—nature always works to cover soil. Providing a natural "coat of armor" protects soil from wind and water erosion while providing food and habitat for macro- and microorganisms. It will also prevent moisture evaporation and germination of weed seeds.
3. **Diversity.** Strive for diversity of both plant and animal species. Where in nature does one find monocultures? Only where humans have put them! When I look out over a stretch of native prairie, one of the first things I notice is the incredible diversity. **Grasses, forbs, legumes, and shrubs all live and thrive in harmony with each other.** Think of what each of these species has to offer. Some have shallow roots, some deep, some fibrous, some tap. Some are high-carbon, some are low-carbon, some are legumes. Each of them plays a role in maintaining soil health. Diversity enhances ecosystem function.
4. **Living roots.** Maintain a living root in soil as long as possible throughout the year. Take a walk in the spring and you will see green plants poking their way through the last of the snow. Follow the same path in late fall or early winter and you will still see green, growing plants, which is a sign of living roots. **Those living roots are feeding soil biology by providing its basic food source: carbon.** This biology, in turn, fuels the nutrient cycle that feeds plants. Where I live in central North Dakota, we typically get our last spring frost around mid-May and our first fall frost around mid-September. I used to think those 120 days were my whole growing season. How wrong I was. We now plant fall-seeded biennials that continue growing into early winter and break dormancy earlier in the spring, thus feeding soil organisms at a time when the cropland used to lie idle.
5. **Integrated animals.** Nature does not function without animals. It is that simple. Integrating livestock into an operation provides many benefits. **The major benefit is that the grazing of plants stimulates the plants to pump more carbon into the soil.** This drives nutrient cycling by feeding biology. Of course, it also has a major, positive impact on climate change by cycling more carbon out of the atmosphere and putting it into the soil. And if you want a healthy, functioning ecosystem on your farm or ranch, you must provide a home and habitat for not only farm animals but also pollinators, predator

insects, earthworms, and all of the microbiology that drive ecosystem function. (Gabe Brown)

We have been implementing some of these principles on our farm for several years now. We are completely no-till on all of our ground; we plant cover crops and graze our beef cattle on our cover crops. After all the reading and research we have done, we realize we have so much potential to build our soil.

### **Our goals for regenerating our land**

We want to move away from using synthetic fertilizers, herbicides, insecticides, and fungicides, with the goal of one day eliminating those inputs. We would also like to get away from using genetically modified seeds. All these things cost a lot of money, and many are harmful for our soil health, environment, and ultimately human health. I have been advised that I can't just quit using these things all at once because I could experience crop failure from disease, pests, or lack of fertility. I need to build soil health first, and that can be a slow process.

### **Things we want to do to move us towards this goal**

I want to take 54.86 acres of our home farm, and turn that into our most intense experimental ground.

### **Year One**

Starting in 2024, I plan to plant soybeans across 43.34 of those acres, and corn into 11.52 acres. Currently, I have a wheat, tillage radish, and crimson clover mix cover crop planted in the fields where I plan to plant soybeans. This year, I want to wait to terminate that cover crop at least until the second week of May. Normally we terminate our cover crops in the early part of April with a herbicide mix. This year, I plan to plant directly into this cover crop, and then terminate the cover crop with a roller crimper (if I win the grant in time) or mowing it short, using an herbicide only as a last resort.

On the ground where I am planning to plant my corn, I have a cover crop mix of ryegrass, crimson clover, and canola. On these acres I want to mow that mix short then plant my corn directly into it the first week of May. By letting all the green matter grow on both my corn and soybean ground for this long, and terminating the cover crop in this

way, I hope to eliminate one herbicide pass this year. Doing this will allow the clover to store more carbon in the soil while building organic matter. It will also allow the clover to produce as much nitrogen as possible for the next crop. This practice will increase the water holding capacity in the soil. The beneficial insects will love the crimson clover and canola while it's blooming, and then when things die down, they will have habitat.

I plan to reduce the amount of my synthetic fertilizers I normally apply to my corn field by allowing the crimson clover to grow to its full nitrogen producing potential. I plan to apply my fertilizers in smaller amounts by foiler spraying the corn vs broadcasting or dribbling all my fertilizer on the ground. I usually put down 150 units of nitrogen, but by foliar feeding the crop, I hope to reduce that to under 50 units.

Also in Year One, I plan to plant cover crops in the fall, specifically thinking about next year's cash crop. I would like to be able to fly a mix of 25 lbs hairy vetch, 30 lbs rye, and 10 lbs crimson clover per acre into the 43.34 acres of standing soybeans the last week of September. The following year we will plan to plant corn into this cover crop. The heavy hairy vetch and crimson clover will supply almost all the nitrogen that I would need for my corn the following year. The rye will help hold up the legumes, and will add organic matter to my fields to help build soil and suppress weeds the following year. The cost of planting this cover crop mix will be close to \$100/acre for just the seed, plus the estimated cost of \$30/acre to fly this mix into the standing soybeans. The total estimated cost to plant this mix over the 43.34 acres would be \$5,634. The cost per acre to do my normal program of putting out saved wheat seed would be \$30/acre so the total cost to plant those acres on my normal program would be \$1,300. The total cost above my normal cover crop planting practices would be \$4,334.

In my 11.52 acres of corn, I plan to broadcast a mix of 75 lbs of rye, 4 lbs tillage radishes, and 10 lbs of crimson clover per acre. I plan to plant soybeans into these fields the following year. The heavy rye will take up any nitrogen left over from the corn crop as well as give great ground cover the following year in the hopes of eliminating a herbicide pass altogether. The radishes will help take up any nutrients left over in the fields, as well as break up compaction and hopefully scare away any slugs the following year due to the high levels of sulfur in the radishes. The crimson clover will help add back some nitrogen to the soil for the soybeans next year, as well as attract beneficial insects. The total estimated cost of planting this mix including the seed, and planting cost would be \$1,244 across all 11 acres. The total cost of my normal wheat cover crop program would be \$391. The total cost above what I normally do for cover crops would be \$853.

After these cover crop mixes are established, I plan to rotationally graze my cattle on these crops sometime between December and the following planting season. This will add economic value to the farm by being able to feed my livestock. It will also help to feed the microbes in the soil from the cattles' waste, as well as bring more fertility to future cash crops. The cattle press some of this organic matter into the ground, again feeding the microbes. The key here is to not graze the cover crops too hard. If we only graze about 40% of the above matter, the cover crop will bounce back quickly. To graze the cover crop effectively in this way I will need to purchase fencing material that would help me do this. The upfront material cost would be \$1,969; this should be enough rotational fence to last for three years. Managing cattle in this way also takes more labor; approximately two hours every week over what I would normally spend with them. This would equal at least 40 hours in a 5 month period. Forty hours at \$20/hr is an \$800 labor cost. However, this cost may be absorbed, as I will be saving money by not needing to feed hay to my cows during this period of time, as well as saving time and equipment cost by not needing to bail hay in the summer. Another benefit of grazing in this way is that it moves the cattle around the farm which prevents them from overworking the ground, causing nutrient run-off and an over abundance of manure in one area which also causes nutrient run-off. And yet another benefit is not needing to spend time and equipment cleaning out the cattle pens and spreading that manure.

## **Year Two**

I plan to plant the 43.34 acres into corn, and the 11.52 acres into soybeans.

I want to wait until the second week or so of May to plant corn. This will allow the hairy vetch, and crimson clover to produce the maximum amount of nitrogen. This will also allow the rye a chance to mature so when I roll and crimp the cover crop, it will die. About a week after I plant the corn I plan to roll and crimp the cover crop to terminate it. By doing this one week later, I hope to eliminate the need to spray a herbicide. This should produce a very thick mat of mulch that will suppress almost all weeds and grasses. Because it is planted later in the spring, the corn should grow quickly, and should soon be able to shade out any weeds that will try to come up. If the weeds do become a problem, I will have to come in with a herbicide pass, but the goal is to grow a crop of corn without using a herbicide.

My plan is to see if I can completely eliminate the need for synthetic fertilizer on these 40 acres this year. When the corn is about knee height, I will take a tissue sample and make sure I have plenty of fertilizer for it to grow. If it is showing deficiencies, I plan

to foliar feed the corn. If not, I will have accomplished my goal of not adding any synthetic fertilizer to a corn crop.

I will also be monitoring this corn crop for pests, and will only use an insecticide if it is absolutely needed. My goal is to add no fungicides, or insecticides to the corn, both of which have been common practices in the past.

Applying fungicides and insecticides kills both good and bad insects. The same with the fungi, the fungicides kill both good and bad fungi. The goal is to produce a healthy soil that creates a habitat for good fungi, and beneficial insects. If these are present, hopefully they will eliminate the need to put these expensive and harmful chemicals on my land.

On the 11.52 acres, I plan to plant soybeans into my cover crop around the first week of May. I then plan to roll and crimp that cover crop around the third week of May (or sometime after the soybeans have emerged from the ground, but before they get higher than five inches). According to my research, this will not hurt the soybeans, and is a way to terminate the cover crop without the use of herbicides. Again killing the crop this late will put a healthy mat of mulch down hopefully eliminating the need to apply an herbicide. I also hope to eliminate all fungicides, and insecticides, and only use these products if absolutely necessary.

Assuming I liked the results from my Year One cover crop program, I would plan to repeat the same mixes into my corn, as well as the same mixes into my soybeans. However, I may change some of my mixes depending on how they worked. The mix would be 25 lbs hairy vetch, 30 lbs rye, and 10 lbs crimson clover flown over my 11.52 acres of standing soybeans. The mix would be 75 lbs of rye, 4 lbs tillage radishes, and 10 lbs of crimson clover planted into my 43.34 acres of corn. The total estimated cost for planting these mixes over the total 54.86 acres of both corn and soybeans, would be \$6,251. The normal cost of planting my wheat cover crop over these acres would be \$1,865. The total cost of planting these cover crops over my normal procedures would be \$4,386.

I plan to rotationally graze my beef cattle on these cover crops, thereby adding more biology to the soil and increasing soil health.

### **Year Three**

This year I hope to fully accomplish all my goals. If I did not have to use any herbicides, or insecticides the previous year I would know I am ready to make the leap

into non-GMO seeds. If that is the case, I will plant non-GMO soybeans into my 43.34 acre plot and non-GMO corn into my 11.52 acre plot this year. I will also plan to continue the same practices of intending to use no herbicides by using a roller crimper to terminate the cover crop. I plan to adjust my planting and rolling and crimping times according to what I have learned from the previous years. It is my hope to not to use any insecticides and fungicides over these acres for this year...using them only if absolutely necessary. I also plan not to use any synthetic fertilizers on my corn. I will do a tissue sample when the corn is knee height, and only add fertilizer if the plant is deficient in anything.

I plan to try the same mix of cover crops this year, flying a mix of 25 lbs hairy vetch, 30 lbs rye, and 10 lbs crimson clover into my 43.34 acres of soybeans. I also plan to plant a mix of 75 lbs of rye, 4 lbs tillage radishes, and 10 lbs of crimson clover into my 11.52 acres of corn. I will adjust the rate or variety of seeds according to what I learn is working, with the goal of keeping the ground covered, doing what is best for the soil, and for the benefit of the crops to follow.. The total cost of seeds/applying the seed over the normal practices on all 54.86 acres should be the same as Year One, \$5,187.

I plan to continue the practice of rotational grazing my cattle on the cover crop. I believe that doing this for many years will play an important part in building my soil health.

### **Long term benefits.**

I know that, in the short term, this way of farming will not be easy; I will have a lot to learn along the way, but I really want to be building my soil and not depleting it. I believe if we all continue farming the way we are currently farming, it is going to end badly. It costs more money than ever to buy pesticides, synthetic fertilizers, and GMO seeds, and it seems that crops are taking more of each of those inputs to produce the same yield. Weeds keep getting smarter than the chemicals we are using, so we need to add a greater amount or harsher chemicals to do the same job. Soil gets more depleted so we need to add more fertilizers. Insects and crop diseases keep increasing so we need to add more fungicides and insecticides, killing more of our mycorrhizal fungi, and more of our beneficial insects. Bees are especially hurt by all these fungicides, and insecticides. Without these bees pollinating we are at risk of losing the ability to grow many fruits and vegetables that require pollination to grow.

What about all these chemicals we are using today? Do they really cause cancer? I used to laugh and say Roundup is harmless, but is it? My eyes were opened to this a little more when my wife, started seeing a nutritionist for some health issues. Her nutritionist

did blood work, and one of the tests was for harmful chemicals because has been around agriculture her whole life, and even had a job that included applying chemicals. Her blood test came back, and different chemicals that we apply to our fields every year were showing up in her blood. I'm not here to say that chemicals are bad, or we need to get rid of all of them because we are killing ourselves, but I am saying that I think the world needs to wake up to the potential dangers that they may be causing us and future generations.

Also what about climate change? I used to laugh about that as well, but after experiencing year after year of warmer weather, hearing the older generations talking about how weather has changed in their lifetime, and looking back in history, I have to think that maybe there is something to it. Can I be a part of helping reduce the amount of carbon in the atmosphere supposedly causing climate change? I believe I can! I don't know to what extent, but I can't help but think my ground would surely be capturing a lot more carbon if I would let my cover crop grow to its full potential in March, April, and May, producing as much as 12,000 lbs of organic matter per acre. I don't know how to measure how much carbon that would be pulling from the atmosphere, but I believe it would be a considerable amount.

If this kind of farming became the new mainstream way of farming, I do believe it would bring about much healing to our planet. While I have read a lot about this type of farming from others, I have never seen, or heard, of anyone else trying this on the eastern shore of Maryland. Maybe I can be a part of helping other farmers think outside the box when it comes to farming in a new way. I definitely welcome the Maryland Department of Agriculture to walk beside me in this, and add helpful tips along the way. I also plan to do some posts on my social media about some of my new experiments. Farmers also talk, and I'm sure I'll get my fair share of questions if they see my fields are still not planted by the first of May, and they see me running my planter through a 5 ft tall rye/cover crop. Hopefully, if I have success farming this way, farmers around me will take note, and begin farming like this on their land.

For the main experiment I plan to focus on these 54.86 acres, but if all goes well I would love to implement these practices on all 400 acres, and I'm sure my brother would soon follow with his 350 acres.

### **My Financial needs for this project.**

Change is hard. I am currently growing pretty good yields across all my farms, and able to farm fairly profitably. Trying something new requires risk, and those acres might



not have as high a yield. Change in this way also requires new equipment that I do not have. This equipment is fairly expensive, and as a young farmer, it is something I am not able to afford. To be able to take this desired risk, I will need a roller crimper and an agricultural drone.

The roller crimper I would like for the job is a 30 ft roller crimper from I & J Manufactures. This piece of equipment is what I need to lay that big mat of cover on the ground while killing it at the same time. This will be a key piece for me to be able to eliminate herbicide passes, and handle that mat of organic matter. The total cost of this piece of equipment is \$34,800. (Due to the timing of this grant, I am uncertain as to whether I'll be able to purchase one in time to use in Year One, but will definitely have it ready for Year Two.)

The total estimated cost of the cover crop seed, and applying that seed above my normal practices, would be \$14,760. This would be the total amount to cover all 54.86 acres over the 3 year program period.

A new tool that would be a game changer for farming in this way would be one of the new agricultural drones. Being able to have one of these on the farm would allow me to more easily foliar feed my corn nutrients instead of running my sprayer over those acres. Running a sprayer over my corn, as it gets higher and needs more nutrients, can cause a lot of damage to my crop by running over the crop. Running a sprayer also takes more fuel and time. Having one of these drones would also allow me to more easily spot spray problem areas in the field vs ride over the whole field to spot, and spray the whole field with my sprayer. Having a drone would allow me to also fly my cover crop seed into my standing crops. This would allow me to put the seed down at the best possible time. I usually hire a pilot to fly on my cover crop, but it can be difficult to get the seed on at the perfect time because I need to schedule with the pilot. Also, airplanes are not as good at getting the seed to all the right places. Often they miss the edges of the fields and get too much in the middle of the fields. Many of the fields I have are smaller, and in order to get cover crop seed spread evenly across those fields, using a drone will be key. If spots are not covered completely with seed, these areas will be places that weeds and grasses will get out of control. This will cause me to not be able to achieve my goal of using no herbicides.

The cost for the DJI Agras T40 (full kit) is \$32,500. It will take several weeks getting the paperwork and licenses to fly this drone legally. I will need the Part 107 license; this requires studying for the test, and going to an FAA facility to take the test. The cost of this test is \$175. I would also need several other licenses and a physical. I will

hire a company to help me through this process and get me operational at a cost of \$2,000. I estimate it will take 120 hrs. At \$20/hr, that brings the cost to \$2,400. The total cost for the drone and my licensing is \$37,075.

Due to lack of time between now and the busy spring season, I will wait until winter to purchase the drone and do all the paperwork, with a goal of being fully ready to use the drone by Year Two.

What does my current method of farming cost, and what are the cost savings for this newly proposed way of farming?

Current cost to plant an acre of corn.		Current cost to plant an acre of Soybeans.	
GMO corn seed	\$100	GMO soybean seed	\$ 60
Fertilizer	\$150	Fertilizer	\$ 40
Insecticide	\$ 16	Insecticide	\$ 6
Fungicide	\$ 12	Fungicide	\$ 12
Herbicides	\$ 50	Herbicides	\$ 50
Equipment/ labor	<u>\$135</u>	Equipment/labor	<u>\$100</u>
Total input cost	\$463	Total input cost	\$268

Input cost per acre if I am able to achieve all my goals of no chemicals, fertilizers, insecticides, fungicides, and planting non GMO seeds.

Corn		Soybeans	
Non-GMO Seed	\$ 30	Non-GMO soybean seed	\$ 30
Equipment/labor	\$100	Equipment/labor	\$100
Special cover crop seed	<u>\$100</u>	Special cover crop	<u>\$ 75</u>
Total input cost	\$230	Total input cost	\$205

Total estimated cost savings for farming in this new way would be \$233/acre for corn and \$63/acre for soybeans. Doing this across all my acreage will really add up (especially if I can get the same (or better) yields from these fields)!

**Saving money**

**Building the soil**

**Benefiting the environment**

**STATE OF MARYLAND  
MARYLAND DEPARTMENT OF AGRICULTURE**

**APPLICATION FOR FINANCIAL ASSISTANCE: PROJECT BUDGET  
Healthy Soils Competitive Fund 2024**

Please complete the project budget table below and outline expected costs of implementation over the next three years. Costs described should be specific to the proposed practice(s) and associated management. No overhead or indirect costs are eligible. Only complete rows as necessary, as not every item listed will be relevant to every application. Be sure that the submitted project narrative and budget justify one another.

Please provide the best available information to date on the Project.

Item	MDA Grant Request	Other funding sources
Labor Cost \$ 7,500 (include estimated labor hours) 300	0	7,500 OUT of POCKET
Fringe/Benefits \$		
Materials \$ 14,760 Cover/cropSeed-	14,760	

