Sandy Arrow Ranch

Declaration of Independence

(From Chemicals)

By Eric Dillon, Owner

February 2017

The Mission

My mission is to create a farming model focused on creating agriculture practices that improve the health of humans and the planet. I want to:

- Prove that farmers can break the chemical cycle that is modern agriculture by creating a new operating paradigm that dramatically upgrades current alternative farming methods (i.e., better than organic)
- Create food that is so nutritious it is medicine.
- Create climate-friendly agriculture practices that help solve climate change.
- Cleanse the water table while stopping wind and water erosion.
- Prove that if you take care of the soil, you create healthier livestock and wildlife.

The Sandy Arrow Ranch ("SA Ranch") will be a test case to accomplish these goals. The plan is to focus on the soil by utilizing science based biological solutions to return the ground to nature's optimal balance. Creating and sustaining healthy microbial communities in the soil is the pivotal component. These lofty goals need to co-exist within a "wow" based economic model that is an order of magnitude better than conventional farming practices. Success will be defined not only by results on the SA Ranch, but by the adoption of our model by farmers, consumers and all participants in the food chain.

Introduction

Detailed below, you will find excruciating detail on the history of conventional chemical based agriculture, my catalyst for this project, the issues with conventional agriculture, the science, review of alternative methods and detail on "the farming answer" we are pursuing. For those of you who are passionate (or shocked) about America's food quality, I would urge you to read it all. However, we live in a world of time constraints. In the interest of making sure the "punch line" is delivered, I am putting the conclusions, which are "calls to action", first. If you prefer to read this sequentially, please skip down to the "Background and Catalyst" section and begin there. Thank you for taking the time to read about our efforts.

Conclusion First

Industrial chemical farming is a disaster for human health and the planet. The SA Ranch is striving to create a new sustainable agriculture model that produces more nutritious food, is climate friendly, cleans water, prevents erosion, and is a robust new economic paradigm for the farmer.

If you are a farmer, I want to share everything we are doing. I want you to convert to sustainable farming because I believe it will provide you economic benefits while you create more nutritious food for the world. I want to make your farm drought resistant. I want to cut your input costs by 70% and work to create a consumer driven market for "food as medicine" which will attract premium prices. In addition, your new climate friendly agriculture practices may have other value. I believe that you will dramatically

increase your land's ability to sequester carbon. I am working to make a viable market for this carbon. Obviously this all sounds like "pie in the sky / save the world" stuff and my neighbors in Central Montana are shaking their heads thinking that I am crazy. What I do know is that the world needs a new model. Our sustainable agriculture project won't be smooth, we will make mistakes and we will have setbacks, but we will persevere. You will be able to track everything we are doing, keep watching, you can learn from our mistakes and we will show you the way.

If you are a gardener, read about glyphosate at the very least. Hopefully you stop using Roundup (vinegar works just as well to kill weeds), make a little compost and watch some of Dr. Elaine Ingham's videos for the health of your family.

If you are the buyer of organic products for Costco or Whole Foods (or any large food seller), I am here to tell you that what we are doing is the future. Once we proof this process, the outcry from consumers for climate friendly, highly nutritional food is going to be deafening. You should call me right now and be a leader not a follower on this concept. Help me get "sustainable farming" certified in the same way organic has been certified. Help me educate consumers so they know what "sustainable" means and how many chemicals they ingest today. You need to be in this market and your support will help us convince and convert other farmers which will provide the volume of product you need.

If you are producer of processed food, call me. Let's create a new cereal with my "sustainable agriculture" grain as the base or just turn your shredded wheat product into something way healthier. Let's get your nutritional research folk on this project right now. Help me prove the power of healthy soil's micro-organisms. Help me create consumer demand for food that is medicine. Consumer demand will cause farmers to convert. You will be doing the right thing for food and the planet which should be your corporate ethos.

If you are a company that cares about the world and strives to be carbon neutral -- I don't care if you are a tech company or make engines -- sequestering carbon through sustainable agriculture practices will be of significant interest to you. Conventional agriculture has been a huge contributor to global warming. We can reverse this. Although the protocols have not been established yet to make agriculture carbon tradable, they will soon be created. On the SA Ranch, we will be monitoring the carbon we sequester in a scientific and robust way. Helping us create a market for agricultural carbon would help improve the economic model for farmers of climate friendly agricultural practices like ours. Better economics means more farmers will convert which means more carbon sequestered, healthier food, less nutrition related diseases, and cleaner water. This all translates into the most admirable model of corporate responsibility I could imagine.

If you are a large institutional "impact investor" who is looking for a transformational investment that combines real assets (farmland) with potentially ESG benefits that are off the charts, please stay tuned. If you already hold agriculture land in your portfolio make your managers read our "declaration". If you are inspired, follow my lead and purchase/convert conventional farms to organic.

If you suffer from immune system issues like Crohn's Disease (why did our parents never hear of many of these diseases?), stay tuned as the cure may be coming. The following quote from a sustainable farming focused web site is maybe farfetched but maybe not:

"There's a gentleman out here who's a physician. He has a mobile practice. One of the things that he does, his 'prescriptions,' is giving his patients a list of foods that they can get from Levi Miller's Amish farm – you know, raw milk, pastured eggs, and things like that. This is part of his Rx for his patients. I think this is going to have to be more common instead of rare if we're going to start turning around these health problems. Because food is the medicine, as you know. It's the ultimate medicine, because it's so complex. Taking supplements is great, but it doesn't replace food in and of itself."

Background and Catalyst

Before I get to my "catalyst" on the SA Ranch, let me give some big picture context. When early homesteaders and pioneers first started farming in the West and Midwest, there was deep organic material and natural bio-diversity. This rich soil resulted in high crop yields (even using primitive methods) without significant pests/weeds because the soil was perfect. Unfortunately, when modern tilling (i.e. tractors) burst onto the scene, we over farmed and over tilled which upset the ecosystem to the point where the U.S. experienced the dust bowl and all sort of disasters including grasshopper plagues etc. In short, mechanical horsepower and the "tilling" mentality it created killed the micro-organisms that make soil healthy, leaving the farmers in a tough spot as yields kept trending down. Unfortunately the reasons for these yield declines were misunderstood because dirt all looks the same and farmers began to embrace anything new and fancy.

I am giving little air-time to all the nuances related to farming in the 20th century but certainly declining yields opened the door to experiment with human devised agriculture cures. To fill this need the chemical company doctors first prescribed chemicals and later GMO bio-engineering. The cornerstone of the chemical system was the ability to synthesize nitrogen fertilizers, and the advent of Anhydrous Ammonia after WWII. In depleted soil, these chemicals had a spectacular impact on food production, particularly cereals and beef. For example, corn in the mid-western USA, wheat in Australia, soybean in Brazil. This in turn supported an exponential increase in the human population. However, the ever increasing use of nitrogen based fertilizers led to an increase in the incidence of disease in plants, in animals (meat and milk) and in turn to humans. The worldwide increase in crop diseases necessitated an increased investment in chemical pesticides, herbicides, fungicides to control them and led to the creation of GMO crops which offered higher yields but could withstand the chemical baths needed to grow food. The "Industrial Farming" paradigm was off and running and it was perceived to be integral to supporting the world's exploding population. Thus conventional agriculture was born and it spread like wildfire across the globe.

Today, conventional agriculture is a broad term that has a number of definitions, but a crop can be classified as conventional if synthetic chemicals are used to maintain the plants. Unfortunately, as science

advances (and soil is depleted) an increasing amount of chemical and energy input is required to produce the highest possible yields. The negatives of conventional farming are well known as this USDA quote states, "conventional agriculture usually alters the natural environment, deteriorates soil quality, and eliminates biodiversity." I find it ironic and disturbing that the human agriculture solutions created over the last 70 years have been counter to what nature tells us to do. It also should give the us pause that while nature has perfected its practices over millions of years of trial and error, modern agriculture is a post-World War II phenomena developed almost solely around using chemicals to pump up yields. In summary, reducing 100 years of American industrial farming into a few paragraphs is not the scholarly approach. My apologies for that, but given that I am not a scholar, I will take certain liberties for we are focused not on history but the current harsh realities.

I purchased the Sandy Arrow Ranch in 2013. I knew nothing about farming or raising cattle and still don't know much. Maybe this is fortunate because of my farming naïveté I am not burdened by any "this is how we have always done it" baggage. Additionally, 30 years of hearing false promises in the investment world (my day job) has instilled a deep skepticism when self-motivated participants (e.g. in farming, the chemical companies like Monsanto) offer advice. Let me be very clear on this point, Monsanto is not the only guilty chemical company but it is definitely the poster child. The Monsanto's of the world are typically offering farmers advice both directly in connection with chemical purchases and indirectly through the multiple segments of the food production supply chain they own and supply. Additionally and more alarmingly, many farmers follow advice that comes to them through research sponsored by chemical companies but disguised as University research. In my time looking into farming practices, I have discovered that selling chemicals to farmers is a more incestuous racket than the rigged shenanigans of Wall Street. Compounding the problem in real life is the fact that the vast majority of the farming community is resource constrained and controlled by their bank. The local banker, blindly (in my opinion) follows and forces their borrowers to farm….you guessed it, the chemical way. I need to underline this point a bit for the impact banks have on farming is shocking, even third and fourth generation farmers carry debt. On top of mortgages and equipment loans, often they need to borrow annually to procure seed for planting. Lenders do not want farmers to experiment; they want farmers to farm conventionally. I give the background above for context since you need to understand how "locked in" this awful state of chemical affairs is on America's farms. Because of the constraints in the system, very few people can or will take a "clean slate" approach to identifying solutions.

Hopefully you have realized this already but my catalyst for this project was simply pure shock at how badly a farm like the one I now owned was treating the land. Like most of the northern plains, the SA Ranch grows dry land wheat. The program for us (and virtually everyone growing dry land wheat) is a "winter wheat – summer fallow" program where wheat is planted in the fall, grown and harvested the following summer and then the soil is rested for a year. The term "rested" is a misnomer. What really happens is that farmers poison the soil with glyphosate, killing everything (and I mean everything). The result is 12 months of bare dead dirt. Where in nature does one find bare dirt? The answer is possibly following natural disasters. Conventional agriculture creates disasters every other year. Outside a few organic farms (more on this later), there is no "soil" in the northern plains states only dead dirt. To grow a crop in dead dirt (or on Mars) one has to put down an obscene amount of synthetic nitrogen based

fertilizer (which is a petroleum product) and because weeds are a first succession crop (meaning they are the first to grow in bad soil) one has to spray further chemicals, multiple times, to kill them. If this is not enough one also has to spray pesticides for there is no "balance" in dirt that has zero bio-diversity (meaning there are not good bugs to eat the bad ones). This crime on nature was my catalyst to explore alternative farming practices.

As part of my research, I met with one of the top soil scientists at Washington State University ("WSU") which is a strong agriculture college and my undergraduate alma mater. The Palouse farming region around WSU'S campus is some of the most productive (highest yielding) wheat country in North America. As a result, the farmers in this region have money and should be less constrained, more inclined to experiment. I explained my observations about conventional farming to the scientist at WSU and her immediate response was "yes I know, we are in the middle of an environmental wasteland here in Pullman". When I asked why the research efforts at WSU were not focused on doing something about this "wasteland" her response was that there was not any research money for the programs I was discussing, nor were there receptive farmers. It was what wasn't said that was more telling in this discussion and here again I see the chemical companies. Do they own the universities research budgets? I don't know but the conspiracy theorist in me can't help but feel that the chemical companies are not innocent. Keep in mind that if they get farmers to poison the soil and destroy the microbial population once (creating dirt) they own them. At today's wheat prices, many small farmers are going to lose their farms due to chemical costs (which are 70% of the costs to grow wheat). Why Michael Moore has not done a movie on this topic is beyond me.

The list of harmful conventional/chemical farming causes is long. To name a few issues:

- There is compromised nutritional value in modern agriculture crops that are grown in dirt stimulated by synthetic fertilizer (petrochemicals) and sprayed with herbicides and pesticides. In our food, artificial compounds have replaced natural systems. Nutrition does not come from petroleum products, it comes from healthy soil. In fact nutrition comes from the beneficial microbes — bacteria, fungi, protozoa, nematodes, and micro-arthropods (in healthy soil there are 7 billion microbes per teaspoon – there are great microscope pictures of these microbes in the "From the Lab" section of this website) that live and work creating organic matter. To thrive, these micro-organisms need bio-diversity. With the modern mono-culture cropping system and non-stop spraying, the micro-organisms have been killed and with them the nutritional value of our food.
- The chemicals farmers put down turn ground water toxic. My well water on the SA Ranch is toxic – we can't drink it but the 1,000 cows on the SA Ranch have to. Further, the creek that runs through my ranch is also toxic due to all the leaching of chemicals upstream. My scientists who have done a lot of work in Iowa tell me that nobody in Iowa can drink out of their wells for all ground water is toxic. Like my ranch, most ranches in the U.S. require their farm animals to drink the very ground water that modern farming practices have made toxic. In farming country, toxic water is the norm.
- It has been estimated that up to 2/3 of the deaths on the planet are directly or in-directly caused by diet. Compromised immune systems due to lack of nutrients in our diets is something we are just

admitting and given how young modern agriculture is and how hard this data is to pull together, the outcry is not extreme and this is why chemical companies continue to prosper. We don't really know the cost to America of eating unhealthy food, but clearly obesity and diseases of the immune system are rampant and they are not due solely to sugar drinks and empty snacks.

- The current crop rotation for dry land wheat farmers with a mono-crop one year and bare dirt the next is very susceptible to erosion. The SA Ranch is in (as is most of the northern plains) a windy area of the country and at times it becomes a dust bowl with all the fallow land. Worse than wind though is the cloud bursts of rain. The use of big heavy tractors in fields all the time (all the chemical application) causes compaction just down past where the tilling equipment goes and thus the fields become almost like sluice boxes. Every year, massive amounts of top soil wash off the SA Ranch (the Natural Resources Conservation Service estimates 4 tons per acre of soil is lost on average annually with traditional farming) and into the Missouri river where it goes to the Gulf of Mexico. There is very little organic matter (less than 1 inch) on the SA Ranch and top soil flies or washes off the ranch every year. If something does not change, top soil will all be gone at some time in the future. When it is gone, there will be no more farming. In fact, the loss of top soil is burning out farmland across the globe with many countries losing arable land at alarming rates. Land degradation globally is estimated at 10 million hectares annually. Since 1960, it is estimated that 1/3 of the world's farmland has been lost due to erosion or degradation. This loss of arable land has grave strategic implications for the USA as well global food production.
- Modern agriculture has been a major contributor to global warming. Bare dirt does not sequester any carbon, living roots and the micro-organisms (especially fungi) they create can sequester up to 10 tons of carbon per year per acre. Scientist estimate that up to 20% of the harmful carbon emissions are due to agriculture practices. 2014 was the hottest year globally on record, 2015 was hotter than 2014 and every month thus far in 2016 has set new temperature records. The UN/World Bank just declared climate change the top issue facing humans. Recent climate change summits have galvanized around setting climate change "maximum" goals. Agriculture does not have carbon protocols in place right now to create "tradable" carbon and every acre of conventional agriculture accelerates this "warming planet" issue.
- Modern agriculture does not retain water in the ground for the living roots are not deep if there are any at all. Nature with its bio-diversity and deep root systems retains water. If cropping practices could mimic nature, we would have drought resistant crops that would strategically be important to the stability of the countries food source.
- Lastly, I feel compelled to describe in this section some "spin" for it underpins everything. Chemical farming is billed as the cheap way to increase yields which will feed the world and give farmers profit but here is the irony. In the winter wheat –summer fallow rotation everything is killed (i.e. no living roots in the soil) to fallow the ground. In this rotation, dry land wheat farmers only grow a crop every other year. Because of this the "true yield" has to be measured over every two year period primarily because there is not enough moisture in the soil. In central Montana the average yields off winter wheat annually is approximately 40-50 bushels an acre. Given the crop only happens once every two years this works out to mid-20's bushels a year if annualized. 150 years ago, I don't think the Native Americans who planted corn into the wonderful top-soil with rich organic matter (no chemicals needed) on the SA Ranch planted every other year. We are planning on mimicking their original

approach on the SA Ranch once we get the soil back to its optimal natural state. We will plant wheat every year, thus the "bar" for us to show yield over conventional is low. We expect our farming program to lower costs and dramatically increase yields.

The Search for Solutions

I am not the only one to be crazed about the chemical warfare that is modern farming. The current hot potato of chemicals is glyphosate (RoundUp). Last year, the World Health Organization's International Agency for Research on Cancer (IARC) declared it a possible carcinogen and recently other agencies including the UN have declared it "unlikely to be carcinogenic". What is not under dispute is that we all get lots of it in our food and logic should prevail. Do we want to be consuming this much of a potentially toxic chemical with dinner? The attached link below is humorous and scary.

Results of Glyphosate Pee Test

As you can tell in the "pee-test" article link above, because the media has finally recognized how newsworthy stories about chemicals, unhealthy food and/or damaging agriculture practices can be, the spotlight on these issues gets brighter by the day. Free press is a great thing and the public outcry has led to multiple movements driving towards healthier food & farming practices that build momentum every day. I will detail the major efforts below:

Clearly the largest and most visible movement is organic farming practices. Certifying foods as organic has been a huge hit with consumers and demand has boomed with consumers willing to pay 2X or more for organic items. Farmers have responded to this demand & pricing regime but organic remains less than 2% of agriculture land in North America. In a nutshell, to be organic a farm has to be chemical free as defined by the organic certification boards and there are numerous hurdles to meeting that definition. Broadly when certified the language below is the organic motto:

"*Organic farmers do not use the synthetic fertilizers or pesticides—herbicides, insecticides, fungicides—that pollute our shared air, water and soil. According to the National Organic Standards Board, "Organic agriculture is an ecological production management system that promotes and enhances biodiversity, biological cycles and soil biological activity. It is based on minimal use of off-farm inputs and on management practices that restore, maintain and enhance ecological harmony."*

The above statement is noble and its goals should be embraced. However, my view is that while organic is good, it is not great and not enough. Organic farming does not focus on what really matters which is the health of the soil. The charter of organic is to not apply synthetic chemicals and again this focus is a wonderful thing and a critical step but…..organic farmers can apply organic chemicals and they can till the soil. Even if farmers use natural products that kill pests, weeds or diseases, the problem has not been solved, but rather the farmer is treating a symptom. Treating symptoms versus fixing the problem is conventional farming. In our opinion, to be successful the organic farmer should be focused on breaking

the "downward" chemical cycle, not changing the type of chemicals applied. Additionally, and John Deere does not like this truism, but the facts are……**if you till, you kill**. What you kill is the micro-organisms in the soil and as I will keep repeating, killing the microorganisms kills the nutritional value of the food and nature's balance. In reality, organic only goes half way, a true "switch" to fully sustainable farming requires working with nature instead of combating and fighting nature. Sorry to provide anecdotal info for we try to be science/data based, but one of the largest organic farmers in the state of Washington (who needs to remain nameless) is a huge supplier to Whole Foods. He told me that the entire organic product mix that Whole Foods purchases was nutritionally tested versus the same products from conventional (chemical based) agriculture. While clearly we would assume that all the organic food was healthier long term because it holds substantially less trace chemicals (e.g. like glyphosate) than conventional grown products but on measureable nutritional metrics (e.g. vitamins, minerals etc) only 20% of the organic food was better than conventional. Many scientific studies have also been done on this subject and in summary the results as it relates to nutrition are non-conclusive as you can see in the link below:

Organic food no more nutritious than conventionally grown food

The lack of focus on soil and the micro-organisms needed for healthy soil is the likely reason much of the organic food produced is not a nutritional uptick. Lastly, organic farmers are not required to grow in climate friendly manner; they don't always have living roots in the ground and as stated above, these monocultures (with bare dirt at times) practices are not as climate friendly as they could be and this method invites erosion.

Where the organic movement is consumer driven and based on "certification", the second largest movement has been driven by farmers themselves who care about the health of their soil and it is the "no-till, cover crop" movement. This movement focuses on soil health and while not certified, it is a huge up-tick to conventional farming. As the name implies, the two key features of this movement are that the farmers do not till the soil (they drill seeds into the ground to plant) as well as they utilize cover crops to shield the soil. The cover crops will both retain water and create natural fertilizers as the cover crops live and decompose. One of the thought leaders of this movement is Gabe Brown in South Dakota and he is a wonderful spokesperson. See his program at:

Gabe Brown: Keys to Building a Healthy Soil

No till plantings with cover crops *does* build organic matter in the soil and *does* build micro-organisms as well as a bunch of other great things. As it relates to chemicals, building micro-organisms and always keeping a living root in the ground (cover crops) builds nutrients in the soil which reduces (potentially eliminates) the need for chemicals as well as reduces (potential eliminates) the need for pesticides, all while creating a soil structure that retains water. Unlike organic farming, there are few stones to throw at no-till farming other than it is usually a long journey. To get to a spot where chemicals can be eliminated may take 20 years (like Gabe Brown's example). In fact, many if not most farmers in the dry land wheat

zones do some form of "no-till with cover crop" which usually means they leave up their wheat stubble during the fallow year and seed winter wheat into this cover crop in the fall. However, this simple no-till winter wheat farming process is still sprayed and utilizes massive amount of synthetic fertilizer plus pesticides and fungicides so the "no-till" benefit is mostly destroyed. I am a fan of no-till and cover crops in simple or intensive doses. The main issue I see is that the lag time it takes to truly get impactful results is too long. As such the embracement is low (even Gabe Brown's neighbors still conventionally farm) and back to my mission statement, I am looking for a solution that can be widely embraced. Creating a sustainable farming movement centered on the principals elucidated in this document is the only way to inspire a significant positive change in food production.

The Answer

"**It's the economy, stupid**" is the phrase which James Carville coined as a campaign strategist for Bill Clinton's successful 1992 presidential campaign against sitting President George H. W. Bush. All my research on "what to do" on the SA Ranch, led to an equivalent eureka moment of "**It's the soil, stupid**". It all comes down to doing what nature aspires to do optimally in its eco-systems. What nature does is to create a balanced system based on bio-diversity. The key to it all is the *microbial community* in the soil for they are the worker bees. Everyone I spoke to who was trying to break the chemical farming cycle was focused on soil health but most solutions offered were based on anecdotal results and while "look at all my worms" statements were not without value, I was searching for something more objective. Finally I stumbled into the "soil first" teachings of Doctor Elaine Ingham and it all came together. To Dr Ingham it is all about the "soilfoodweb" which is also the name of her company. She started this company after she realized Monsanto was basically sponsoring the research department at the University she was teaching/researching with (Oregon State University) and thwarting her work. Given my ranting on Monsanto we had an immediate connection. Dr. Ingham is a world renowned soil scientist and her mission in life is to teach the world that healthy soil is the answer. Her website is http://www.soilfoodweb.com/. She applies a scientific, quantifiable approach to defining healthy soil and that sort of approach is consistent with how I think and definitely is the program I we will employ on the SA Ranch. In addition to Elaine we are working with soil ecologist Molly Haviland. Dr. Ingham and Ms. Haviland graciously agreed to work with us and the journey to create a new agriculture model for the future began in February, 2016. The best way to understand Dr. Ingham's approach is to listen to one of her speeches. She has 100's of talks that are accessible over the internet (search "Elaine Ingham" on YouTube) and many are brief, but the lengthy one below touches all the core concepts of her (and now our) approach:

The Roots of Your Profits – Dr Elaine Ingham, Soil Microbiologist, Founder of Soil Foodweb Inc.

Converting the SA Ranch: Sustainable Agriculture is the Future of Farming

The SA Ranch currently has 2,500 acres of tilled agriculture land. We have approximately 20,000 acres of grazing land as well but for now we are focused on the agriculture land. Our goal is to go chemical free

with agriculture practices that are climate friendly, retain water, reduce erosion while growing crops that maximize nutritional value at yield rates equivalent (or greater) to conventional agricultural methods. We hope the model we create can and will be embraced by millions of acres of dry land farms globally as this is how our program will make a difference with major global issues such as healthier food, climate change, and clean water. The only way for our model to become ubiquitous is if it is a model that has a clear execution blueprint that farmers can visualize and it has to be a model that has powerful economic incentives for the farmer. This last point is not as elusive as it might seem. If we are successful and eliminate chemicals we are eliminating 70% of the cost of growing wheat. Further, once the consumer realizes that there exists chemical free foods that are more nutritious than even organic products, demand will materialize and premium prices for "sustainable agriculture" products will be paid creating a virtuous cycle that is based on doing the right thing.

If you watch one of Dr. Ingham's videos, it will be crystal clear what our focus is in the SA Ranch project – it is creating healthy soil and the key to healthy soil is a healthy population of micro-organisms. If one has healthy soil, there is no need for synthetic fertilizer, no need for herbicides (weeds are first succession plants), no need for pesticides (in balanced systems like nature the good insects flourish and take care of the bad) and you create land that retains moisture. This is truly a "back to nature" approach and in fact we are creating my grandmother's flourishing totally chemical free garden in Canby Oregon. It is so simple that I want to scream: "*Why isn't everyone doing this?*" To be fair, there are many folks employing the principals we will employ (especially in dairy businesses) but the true case study for dry land wheat has not been perfected. This is our challenge.

Compost is step #1. The goal of this first step is to jump start our dirt into soil. Step #2 is that we have to keep the soil healthy once we get the biology into it. The way we will do that is by having living roots in the soil at all times. Eventually the SA Ranch will have 1,000 acres in hay fields and we are moving to diversified grass hay that does well in our area. Hay is a perennial crop. The way we are planting it will create the bio-diversity necessary to support the biology in the soil. Over the balance of the farm (1,500 acres) we will grow wheat and these acres are going to be where the world will be watching us. Wheat is the #1 crop in the world. Proving there is a better way to grow wheat is the game changer. We are going to grow wheat differently; however, if we have the biology in our soil (and we will) we are highly confident our program will work. The core difference in our approach is that we are going to plant a perennial cover crop in our wheat fields. This crop will be a mix of low growing perennial plants (like clovers) and will be diverse (again the bio-diversity is needed for the soil). We will no-till plant our wheat right into this living cover crop and our goal is to eventually plant and have a commercial crop of wheat every year that grows up through this low cover crop. Living roots will be in the soil at all times and this will support the micro-organisms.

Thank you for your interest in our work.