



## How do I get started with precision nutrient management?

Featuring Carrie Vollmer-Sanders

Sustainability Director, US Farmers & Ranchers in Action

### **DJ May:**

Welcome to the Decode 6 Podcast, where we take your questions about carbon and ecosystem services and match them to the experts with the answers. I'm your host, DJ May. Here's our big question this week, how do you get started with Precision Nutrient Management? Our expert with the answers is the illustrious Carrie Vollmer-Sanders, the Sustainability Director for US Farmers and Ranchers in Action.

Carrie is not just a farmer. Her family grows corn, soybeans, and wheat with a focus on sustainability. But she also has a storied history with nutrient management. In fact, Carrie received the White House Champion of Change award in 2014 for her leadership in developing the 4R nutrient stewardship certification program for Lake Erie. She's a fantastic person to talk us through what it takes to get started with Precision Nutrient Management.

Carrie, welcome. It's great to have you here.

### **Carrie Vollmer-Sanders:**

Oh, DJ. It's so exciting to be here to talk with you guys today.

### **DJ May:**

Perfect. Well, we're going to jump right in. So, give us the overview. What is Precision Nutrient Management?

### **Carrie Vollmer-Sanders:**

Well, so nutrient management is one of my favorite things to talk about because when you can be more precise with your nutrients, not only does it help you grow more crops, it also can help you lose less nutrients to other things, whether to the air, to the water, or just for soil storage later. So precision nutrient management is like spoon-feeding the crop to make sure the crop can get as much nutrients as possible, and you have a higher return on investment.

### **DJ May:**

Fantastic. So, if I was interested in trying that out, how should I get started?

### **Carrie Vollmer-Sanders:**

Well, the first thing is soil tests and know what kind of crop that you're growing. I mean, this is basic agronomy, right? But the other thing is knowing where water moves on your fields. So spring is one of the best times to get started with nutrient management because where water moves, that's where your nutrients will move. Most of them are water soluble, and they'll get sucked up into the rainwater that's on the field, or they'll move through. If you have tile drains, it'll move down through the soil profile into the tile, and then out to the ditches and streams.

So, I think spring is great time. It's also one of the best times to make sure you have your nutrients, what is it that you're going to put on the field, put that plan together, and then think about how you can keep those nutrients in the soil for the long term. So as the plant grows, either you're spoon-feeding it by additional applications or spoon feeding it because you have stabilizers on the fertilizer or inhibitors to keep the nitrogen in the right form for the plant to take up.

**DJ May:**

Okay. So back it up just a little bit to the water. If I'm watching, say a pool form on my field, or maybe there's an area where it's not draining as well, or I have tile, I guess, what is that telling me about when to apply nutrients or what to do?

**Carrie Vollmer-Sanders:**

Oh, great question, DJ. So as the water moves, you can kind of see that it's going to move to the low points in the field. If you have tile drains, you can see that where your tile are, that's where your field is going to dry out quicker. You also have to realize that those are pathways for the nutrients to move. So nutrients can move in a couple different ways. Sometimes, let's take phosphorus for an example, it is bound to the soil, and so when your soil moves, so does your phosphorus. So even though you've done a great job of managing your nutrients, if you haven't also helped manage the water, it can move your fertilizer off the field, and you've just lost all of that, essentially, the money, the fertilizer in the bank, so to speak.

So as you're thinking about nutrient management, oftentimes if you can really pay attention to water management, keeping the water in the soil, not only is that going to help your roots have water to take up, but it also gives them a better option to get the fertilizer into those small root hairs and brought up to the plant.

So when you're soil sampling, you can divide your field up into a couple of different ways. You can do it by zones, you can do it by grids. You divide your field up in 20 acre plots. If you really want to get great at nutrient management, you're probably going to have to take a more precision approach to that soil sampling. So zones of eight acres or less. And you can do that by soil samples. You can take the, they call it Sergio, but you can look at your soil samples within your field and divide it up that way. You can also do it in a grid type fashion. Some people do squares, some people do hexagons. It's completely up to you as a farmer and your agronomist really to figure out which way that you like to look at data the best.

But when you pay attention to the water management, it is a very indicative of how you'll have to manage your nutrients as well. So the other thing, and it happens also with water management, but also looking at the soil pH. So if it's back to science class many, many years ago, but if you look at your soil pH, if it's too high, some new nutrients are not going to be available. It's going to be locked up in the soil. If they're too low, the same thing will happen.

So your iron, aluminum, manganese they have a certain range that they like to be available, and when you're thinking about something that's too high, maybe your phosphorus isn't available. So you can get locked up either way. So you also have to pay attention to that soil pH when doing nutrient management. Again, talk with your agronomist and get those soil samples taken up and

understand which method they like and why, because maybe you would prefer to do it some other way, but understand how best your agronomist can get that information back to you.

**DJ May:**

Yeah. So when you think about maybe designing your soil sampling with your agronomist, or is that a one-time thing? Or how often should you think about doing that?

**Carrie Vollmer-Sanders:**

That's a good question. So on our farm, we have a crop rotation, corn, soybeans, wheat, and so sometimes people say that it should be whatever your crop rotation is. So a three year cycle, different universities will tell you it needs to be a four year cycle. I think that's tough. If you really want to be precise about your nutrients, you might want to go just back to it every two years. And I know it sounds expensive, but honestly, nutrients are one of the largest input costs that a farmer is going to have.

So let's get it right. And we're going into, as they say, a time where maybe the return on investment is going to be a little lower because crop prices will be lower. So it's even more important. Nobody wants to waste money or resources. So if we can do a little bit more high touch management that can really pay dividends both for your yield and for your input costs.

And the one other thing I wanted to bring up, DJ and I have been an advocate for the 4R program since I heard about it back in 2010. So it's been around for a little while, but the 4Rs, if you haven't heard about it's the right rate, right source, right time, and right place. And those 4Rs only work if you also get the right data. You're doing the soil sampling, inputting the right goals, realistic goals, you're taking a look at the water movement, the water flow.

But when we can do a better job with the 4Rs, and when I say better, it's hard for your crops to take up all the fertilizer if you put a hundred percent on in one slug, it's better to spoonfeed, right? It's like trying to have one meal a day. We don't do that as humans. We try to have two or three, sometimes five meals a day, depending on, my teenage boys eat five or six meals a day, and they're growing. And so think about that in the same way with your plants.

So they need to have a little bit of a spoon feeding process. And so that can be the right timing. It can also be the right source. So thinking about adding on, if you're putting on nitrogen and even phosphorus, there's some stabilizing products you can put on with that and inhibitors so that your nitrogen doesn't change form too quickly. And those are some of the things that we need to think about. And there's a lot of resources out there on the 4Rs, whether it's what we have on the Decode 6 website, the CCA program has a phenomenal amount of information. Many of the universities have also transitioned to talk about nitrogen fertilizer management in this 4R context.

So there's a great deal of information out there that's probably very relevant to your geography. So I would encourage people to look at that information also.

**DJ May:**

Yeah, I imagine you can't get away from getting pretty specific when you start talking about how water moves on your own field or what the soil pH is like. And yeah.

**Carrie Vollmer-Sanders:**

That's one of the most beautiful things about farming. So what we do on our farm is a combination of what we have heard many other people talk about, but it's not exactly the same as what everybody else does. And one, I think that's because we have a little bit different soils. We've got more clay soils, we've got water that moves differently. Our fields are tiled differently. Even in the same farm, we can have two fields. One is pattern tile and the other one we haven't got to yet. It's not pattern tile the way we want it.

So we have to manage those fields differently just because of the tiling. And if someone is irrigating, the same sort of thing can happen. They have maybe different types of irrigation on different fields. So it definitely is a higher touch management system, but that higher touch means that you're going to be able to make a better profit in the long run. And that's what we need to look at as profitability.

**DJ May:**

Perfect. And just one last thing when we're thinking about this. Is this just nitrogen and phosphorus we should be focusing on?

**Carrie Vollmer-Sanders:**

Oh, no. So oftentimes, and I get obviously caught up in it myself, we think about the macronutrients, right? The NPK. But you also need to be thinking about those micronutrients because zinc, boron, manganese, calcium, those are all really important to crop growth. And whether it's corn or soybeans, they each need something a little bit different, wheat. And so we need to also pay attention to those micronutrients.

It's one of the beautiful things, if you have the availability of manure, there's so many micronutrients in manure and manure management is its own thing. It's a little bit different than your commercial fertilizer, but if you can get the manure and get it injected into your soil, so it stays there and it's going to be there, it's just a phenomenal resource because of all the micronutrients.

There's also a lot of products out there, and I don't want to promote one over the other, but there's a lot of micronutrient products also, humic acids, et cetera, that have all sorts of these micronutrients into it. When doing soil sampling, you should look at more than just the pH in the phosphorus and the potassium. You need to look at some of those micronutrients because they can help your plants do a better job of taking up nutrients or water, I mean that's part of what they do.

So I thank you for bringing that up. I didn't mean to forget those micronutrients. They might be micro because you need less of it, but that doesn't mean they're less important.

**DJ May:**

Perfect. Well, before we wrap up, do you have any final thoughts or advice? That seems like a lot to take in, but is it hard once you get going?

**Carrie Vollmer-Sanders:**

DJ, my advice is find an agronomist that you trust. It can be at your local co-op or elevator. It can be an independent crop advisor. I have always looked for those credentials, CCA after the name. So CCA is a certified crop advisor, and that just means that they not only have been doing their job right and they have taken a test that says, yes, they know what they're doing, but it also means that they're continually learning and they're continually getting more and new information. So they're not stuck on something that happened in 1990. They're up on the most relevant information in technologies. But hire somebody.

Both my husband and I are... we know a lot about nutrient management, but we hire somebody to help us with our farm just because it's a second set of eyes. And then we can ask the right questions to make sure that our soils are being managed in the right way to help our crop grow.

**DJ May:**

Yeah, and it's an investment too. It makes sense that you'd want to make sure that you're up to date and what's going on.

**Carrie Vollmer-Sanders:**

Absolutely. So we pay attention to a lot different things on the farm, soil management, the crop health. Those are something that we're always doing. Going out and looking at our farm, looking at our fields, walking the fields, usually it's a Sunday activity with the kids so that they can enjoy the tall corn, the smell of corn pollen, et cetera.

But it's one of the best things for you as a farmer to do, is make sure that you have somebody else helping you, because you can't do everything. You can't be an expert at everything. So hire those things out. And having a CCA or an agronomist help you with nutrient management is one of those things that, it's a no-brainer. And there are very great experts in every state and every geography.

**DJ May:**

Fantastic. Well, thank you so much, Carrie. It was great having you on.

**Carrie Vollmer-Sanders:**

Thanks, DJ. Great to be here. Take care.

**DJ May:**

Well, there you have it. If you're interested in getting started with Precision Nutrient Management, first, pay attention to where water goes on your field. Then do some soil testing, check out the pH, make sure that you're all up to snuff. You can implement the 4Rs. And finally, take a look at your micronutrients. Pay attention to how they work with your crops, and if you're deficient anywhere.

And if you enjoyed this episode and you want to learn more, check out the show notes for links to related research and resources. If you're interested in nutrient management or carbon and ecosystem service markets, come visit us at [decode6.org](https://decode6.org). We'll see you there.