



AG, DECARBONIZATION, & CARBON MARKETS

Featuring Jim Jordahl

Project Analyst, Bioeconomy Institute, Iowa State University

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, and today our big question is this, what is agriculture's role in decarbonization and carbon markets?

Here with us to give the answers is Jim Jordahl, a project analyst at the Bioeconomy Institute at Iowa State University. Jim provides project management and leadership support for the emerging carbon program area at Iowa State. He was also part of the team that published Carbon Science for Carbon Markets. He's had years of experience researching carbon credits in a variety of ecosystems, examining soil health and ag water quality programs, and looking at the application of plant-based treatment systems for a wide range of contaminants in both water and soil. So Jim, welcome. It's great to have you here.

Jim Jordahl:

Good morning, DJ. Thank you so much. It's great to be here.

DJ May:

Great. Well, we're going to jump right in. So first off, give me the background information. What created the demand for decarbonization and what do we mean when we say decarbonization?

Jim Jordahl:

Well, a big part of the demand is there are just really extensive corporate commitments across the world towards a net zero target, net zero emissions as well as nations. And that process is just really getting rolling, but it's there's a lot of dollars involved and a lot of interest in looking for a place for those dollars and investments and ultimately those offsets to emissions places for that to go.

DJ May:

So everyone talks about how big these carbon markets are and how fast they're growing, but can you give us any numbers behind that? How can we quantify it?

Jim Jordahl:

Sure. We don't have data yet for 2022, but when you look at the total voluntary carbon market, not just ag, but the total market, it's gone from some \$500 million in 2020 to nearly four times that, or about two billion dollars in 2021. So the scale of increase is quite rapid recently, and even just the much smaller agricultural part of that has seen a doubling over that same 2020 to 2021 timeframe.

DJ May:

Wow. So that two billion dollar value, is that referring to the valuation of the markets? What is that number telling us?

Jim Jordahl:

Yeah, that's the total value of the carbon credits being traded in the voluntary market, about two billion dollars in 2021.

DJ May:

Wow, that is pretty incredible, that increase. So when people are looking at these commitments, I guess, and they're talking about net zero and decarbonization, why did agriculture come up as a solution?

Jim Jordahl:

Well, a couple of pieces of the puzzle. One, just that a large fraction of the total land mass is managed by farmers, by agriculture worldwide now here in the Midwest and elsewhere. And secondly, in addition to reducing emissions, there's a very strong interest in pulling CO₂, pulling carbon out of the atmosphere to just reduce the potential for additional climate impacts. And photosynthesis, or the green plants are about the most efficient way by far there is to grab that carbon dioxide and how we manage the land can definitely be a favorable influence on that process.

DJ May:

Great. Yeah. Well, I know you've been in this space for quite a while now, but what makes this round of using agriculture as a solution for decarbonization different than in the past?

Jim Jordahl:

Well, several things have changed. You guys implied there were some somewhat failed efforts in the past to try and make an agricultural market work, and we're still very early days, but there's just a strong interest now in documenting the benefits of conservation practices for carbon. But other things like water quality, those universes are coming together. There's been a lot of advancements in how models can be used to figure out what is changing in terms of carbon and emissions and how you can aggregate a lot of farms together to get a more efficient process. And those are a couple of the big pieces.

DJ May:

Great. Okay. So in the past, I'm guessing these developments and models, you're relying totally on maybe ground truthing. I guess, how do models fit in with the newer system?

Jim Jordahl:

Well, it's just too expensive to sample all the fields in any statistically viable way, and so there needs to be some combination of physical samples from the field to confirm changes in carbon with a modeling approach that helps you scale that out to many more farms and keep the cost reasonable. But those models have to be accurate. They're getting better and better, but we need a lot more data as well to keep improving those models.

DJ May:

Great. Okay. So those models are for soil carbon sequestration, I'm guessing most of them other than-.

Jim Jordahl:

Yes. Yes.

DJ May:

Sorry. Other than soil carbon, are there other aspects of agriculture that could maybe fit in? You mentioned water quality. Where else can we go with decarbonization and agriculture?

Jim Jordahl:

Yes. A lot of focus has been on the soil carbon credits, but there's a number of other places where agriculture can intersect in terms of things like renewable natural gas and biogas. There are some beginnings of some programs around grazing management and how that might influence carbon sequestration and emissions. The production of biochar, essentially a charcoal like material from crop residues that can be a really valuable soil amendment, but is also potentially pretty valuable in the carbon markets because it's so stable, carbon locked up for a long time. And there's some sectors of the economy that are very difficult to decarbonize things like shipping and aviation, and there's going to likely be a market for various types of liquid fuels for some time to come, and there's a good chance that agriculture's going to play a role in helping to provide those liquid fuels over time.

DJ May:

Give me a quick example of that. So liquid fuels, what are you talking about?

Jim Jordahl:

Well, things like biodiesel and ethanol, and there's also a number of other next generation type fuels that are emerging from the latest engineering research and just need to stay tuned on what they're going to be and definitely keep an open mind because there's new technologies on the horizon.

DJ May:

Great. Good to know. Well, I know new technology is a huge reason this is getting such a big push now, I think, but I'm sure there are challenges. What are some of the challenges that these carbon markets and decarbonization and agriculture are facing?

Jim Jordahl:

Yes, there are indeed a number of challenges. One is just the competitive nature of this space. There's a lot of the investments currently are going towards the forestry sector to establish new forests and preserve those that remain, and they can have a more established process and protocol for those. There's questions of how permanent is the carbon that's sequestered through agriculture, and is the process additional those who are providing these investments or wanting the carbon offsets are requiring or needing to show that what's been done is additional or provides additionality. And these are some real challenges in making the application to agriculture. And there's still some important gaps in the science. Exactly what's happening with nitrous oxide emissions is extremely important and we need to understand that a lot better and how carbon is changing with depth in the soil profile. Most of our data is pretty shallow, the surface six inches or a surface foot, but there's a lot happening below that as well with the application of different practices, we need to understand those things a lot better than we do.

DJ May:

Great. Yeah, no, that's a fantastic overview. You mentioned it's still early stages, but if you're somebody, you're a decision maker in this space and you're looking at carbon markets and you're thinking about maybe what to do with your land, what are the things that you should pay attention to as they develop? What did you look for?

Jim Jordahl:

That's a great question. I just broadly, I just would encourage people to keep an eye on these developments and also to just keep an open mind, because it's a very rapidly changing space and engaging, or right now in any kind of a contract may or may not make any sense for an individual operation, but there's going to continue to be a lot of change, and there may be a market or an opportunity that begins to make sense somewhere down the road. And also just to be prepared for the way things are going. I think the better and better operations can get at maintaining records of really understanding all the inputs and outputs and the energy flows and costs is going to be increasingly important. So those are the couple of pieces that first come to mind.

DJ May:

Great. No, that's great advice. I hear all the time about the record-keeping challenges that come when you try to account for everything.

Jim Jordahl:

Yeah. But there's, I think, better and better tools to help farmers manage that now.

DJ May:

Perfect. Well, I have a bonus question for you, Jim. As you look into your crystal ball of maybe what's going on with decarbonization and agriculture, how do you see this push from governments and industry coalescing? How will it come together? It's so spread out right now and disparate and everyone's doing something different.

Jim Jordahl:

Yeah. I'm not sure how good my crystal ball is, but I'm pretty excited about the potential to look at a broader suite of ecosystem benefits all at once in terms of the value of the carbon, the value of the water stored, how the food is produced, the water quality benefits, and I think we're getting closer and closer to be able to putting a value on that integrated package and hopefully can compensate farmers in the marketplace for those suite of benefits and not just rely on trying to measure any one piece of that like the carbon. But that's what I'm hoping for anyway.

DJ May:

Great. Well, do you have any final thoughts before we close out here?

Jim Jordahl:

No, I don't think so. I sure appreciate the opportunity.

DJ May:

Excellent. Well, thank you so much for being here.

Jim Jordahl:

Thank you, DJ.

DJ May:

If you want to read up on carbon markets, check out the show notes. You can find all of the studies that Jim mentioned in today's episode. And if you're curious about carbon and ecosystem services or if you have questions that you'd like us to answer, come visit us at decode6.org.