

# AEI PREMIUM

Corn Saves America  
Episode 10 – Corn Always Wins

**Sarah Mock:** This is Corn Saves America, a podcast exploring agriculture’s environmental solutions, From ethanol to carbon markets. I’m Sarah Mock.

Confession time: When David, Brent, and I first talked about doing a podcast about ethanol, my vision was of a straightforward falling from grace story. Honestly. Of the many ideas we discussed, I kind of thought spinning the tale of the rise and fall of ethanol would be an easy win.

I thought that because, frankly, I thought I knew most of what there is to know about the ethanol story already. I reported on the RFS and ethanol for years and had a front row seat in Washington to everything from EPA press conferences to meetings with Iowa Senator Chuck Grassley to White House press calls about E15. I even asked former President Donald Trump about ethanol in an interview. I’m by no means a biofuel expert, but I’d been around the issue enough that I felt confident that I had a handle on the story.

I was perhaps a bit less confident about my grasp of ag carbon markets, but mostly in as much as I think very few people feel confident about what is truly known, or currently knowable, about ag carbon markets. Yet I still feel like I had enough background and context to know the shape of carbon’s evolving presence. Why am I telling you this? Because this is the perspective that I brought into my reporting for this podcast. Call it bias, call it feelings, call it an impossible to avoid point of view, this was my square one on this project, where I stood 6 months ago.

Today we’re going to talk about all these ideas, about feelings and bias and point of view, and about how to know things, and make predictions, not assuming that the information you have is unbiased, but by knowing that it is biased and what to do about it. First, though, I wanted to tie up some loose ends with David and Brent. The three of us got together for a final debrief, a freewheeling conversation about how our perspectives shifted over the course of the project. We started by talking about the RFS. Here’s Brent and David:

**Brent Gloy:** Wow, this stuff is complicated, and we can look at it one little piece of it and go, “Well, that was really stupid.” And “Why would you have ever done that?” But. It's just, there's so much more stuff going on, than we probably realized. And at the end of the day, you look at the ethanol deal and I think a lot of your experts said that was well, yeah, it's actually pretty successful. And if you just wait, weigh it out and think about, you know, they actually, we actually developed, they made the ethanol industry legitimate. It achieved its goal of producing that much stuff. And at a pretty reasonable cost. Not without fits and starts on the whole, you know, I think the ethanol story has to give you some optimism for what can be done because all, all the things that people are quick to complain about with it, at the end of the day, it works. And,

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I mean, that should, I think, give us hope, that the same could be true with carbon because I think if I listened to these episodes, I feel like the resident carbon skeptic, on this podcast, but, you know, maybe, maybe I'm being way too skeptical in the sense that we might end up doing something that actually makes a dent at some point. And so, it may not achieve everybody's goals and it probably won't - we know that it's not going to be perfect - but maybe it works to some extent that, we all sit back years from now and go, "Yeah, that actually made a difference."

I thought Scott Sklar made that point pretty well on the RFS and he, by the way was, you know, I enjoy listening to him. I think he's the one that kind of made me a little bit more optimistic because he's like, "Well, yeah, look at this, look at what we've accomplished."

And I thought that was. It was good. You know, you need to hear that every now and then, from somebody that says, "Well, yeah, you know, there are some bad things that could have happened or some things that weren't ideal, but on balance, it's pretty good."

**David Widmar:** I don't think we can ever move forward with policy when we know all of the answers. So, we'll never have all of the answers that we want. At the same time, I think Dr. Breetz did a really good job of talking about how when we make energy policy, we do it when there's an energy crisis. I think this is sort of a good parallel that we tend to deploy policy solutions in the middle of a crisis. And oftentimes we don't have enough data and we're oftentimes trying to make it as quick as possible because by definition, time is of the essence. And so, I think that is sort of something we always have to keep in mind. It's easy to sort of sit back and say, "This policy didn't accomplish X, Y, and Z." And it's never going to accomplish all, like Brent said, it's never accomplished all of the laundry list of objectives, but did it accomplish the big ones?

**Sarah Mock:** To David and Brent, and many of our experts, the answer to that question is, yes. There were surely places where the policy fell short – delivering on environmental benefits tops the list. But the big goal; to get more biofuels into the fuel supply, that was accomplished.

We also spent some time considering the paths that ag carbon markets might be able to take – given the unlikelihood that relevant ag carbon policy will be passed on the scale of the RFS. Policy like this is rare today – and it should be noted that ag carbon market advocates are not interested in creating the kind of federally mandated obligations that arguably, made the ethanol sector so successful. So, what other paths then, are available to ag carbon markets?

**Brent Gloy:** I think on the, on the side of policy too, like right now, you know, you just can't even see how, carbon policy would ever be passed in a bipartisan way. And that would be an interesting thing that go back and look at it on the RFS - how bi-partisan that actually was. But right now, it's hard to see how anything like that could even happen. But I don't think we should rule out the possibility that, you know, this current state of animosity could be changed for something different in the future. It seems like we're stuck in some kind of like, I don't want to use a word equilibrium but that's the one that comes to mind, but we're stuck in some kind of like

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random state where we keep bouncing back from one extreme to the other and a lot of fighting. But I don't think we can rule out the possibility that something will change and lead us to a future where we could again, do large-scale policy like the RFS, even in the case of carbon. But it's going to take a confluence of events for that to happen on the federal policy side.

Now on the, on the private side, it seems to me it's full speed ahead there. And I think it was pretty clear, you know, the lesson from this podcast is that that's going to be full speed ahead until it becomes costly and then it will change. So, let's just quit doing it. Nobody's, the industry is not just going to charge ahead in an unregulated manner and do stuff that becomes really costly. That seem very, very unlikely to happen. So as long as it's cheap and it's moving forward, it'll continue to do so, but once it becomes expensive and binding and requires the actual change in behavior, which we talked about a lot, then all bets are off and without, binding policy, the behavior is not going to change.

**David Widmar:** So, I was over here looking up, the vote for the Energy Independence and Security Act of 2007, the final version passed the House in December of 2007, by vote of 86-8. And the House passed it earlier in December by a vote of 235 to 181. So, support, for both sides, for passing that. I think the other thing to recognize is that the RFS has survived, but it has shown its age, or it has shown some battle scars as it has gone through. We are not using 36 billion gallons of renewable fuel, right?

The cellulosic component did not materialize. I think what the RFS has done that probably needs to be a very important lesson for carbon. And it's going to be something that I think about moving forward, as well as how do you balance the, the tradeoff between something that's rigid that “thou shalt do this” in 10 years from now or 15 years from now, with something that can be flexible given all the uncertainties that happen. So, step back and think about all the things that the ethanol world had to navigate that just weren't a consideration in 2007 - energy consumption or gasoline consumption in the U.S. pretty much flat-lined, the financial recession of '08-09, the pandemic of 2020, fracking, new energy sources coming online to just oil from fracking, and also electric vehicles. And so, I think RFS has survived. That is one takeaway, but it hasn't necessarily survived as folks thought it will in 2007. So, it is sort of evolved, right? It has been, a policy that has been able to adapt and survive and thrive in that manner and that mindset.

So, I think that will be important for, any type of policy that wants to implement change over a long period of time is, we can set the goal marks today, but we have to have flexibility built in of course that comes with the trade off, right. Somebody could, that could be, the flexibility could be the leverage that breaks it or allows, for the dismantlement of it in the future. So, that's a hard trade off to balance.

I think one of the, hopefully one of the lessons here for listeners is that ethanol policy could have evolved in a lot of different ways. The RFS, you know, it started as a tax, right? Well. according to Dr. Breetz, right, the White House was talking about a gas tax and like, and then eventually they put together a proposal that was for any type of alternative fuels. That eventually became,

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you know, Congress passed the ethanol side. And so, it has a lot of different, it could've taken on a lot of different shapes. And so, we need to step back and just not say, "Am I for, or against this broad policy idea?" And really understand the implications for your specific operation, or your specific business, or even how you feel about how this legislation might get implemented. Does it really fit what you believe should be done? Again, I'm using the should because this is a societal question, right? Should society pursue this? Is something individuals and decision makers have to have to think about.

The other element here that has stuck with me is, if you're a farmer, or a producer, or work with producers, I hope that one of the takeaways from this is that the impact that RFS has had on the farm economy. We actually debated this internally, like how do we, write - there's a couple of sentences that we were really trying to figure out how to write it and on one hand. it wasn't this perpetual demand story. It didn't create profitability in the farm sector for forever. It had a big impact on the farmer economy, but we eventually overproduced commodities again, we eventually had burdensome supplies, we had low commodity prices relative to our cost of production. And, you know, from 2016 to really 2019 and parts of 2020 kind of that traditional farm management sort of lean economic returns were back into place.

So, I think help producers and listeners recognize that, if we're going to see a big economic windfall, it's probably not going to be this ATM machine that is going to be paying out every year.

**Sarah Mock:** One of the most important impacts of the new information we've gleaned on how ethanol and the RFS eventually came to be, was how it shifted our perspectives on the RFS timeline, and the potential future timeline of ag carbon market policy. It really underscored how difficult it is today to tell how close to the tipping point we might be.

**David Widmar:** Well, as we started this, I kind of summarized ethanol and I think it's still true. I think I believe this even more after listening to all the other experts is if you were to set back in 1995 or 1990 and said, "We want to put a policy in place, that's going to create effectively 10% of the gas supply is going to come from this renewable source and we're going to use billions of bushels of corn to do this." You would say it was an improbable outcome, right? It was highly unlikely, very improbable, but then all of a sudden ethanol went from improbable to almost inevitable. And RFS just happened at this time of history, where there was an energy crisis and there was a problem and there was a lot of willingness to deploy this ethanol solution to fit that. And I think it's always important to recognize that ethanol had been around for years. It was a technology that had been around for a long time, but it had gotten better. So, the ethanol we use, that technology we use in 2005 and into 2007 was much improved from what we saw from the years before. The technology did improve, but the idea was there for a long time. As it pertains to carbon, I remember in high school reading, FFA speeches or doing a debate talking about how no till was going to allow you to sequester carbon, to potentially get a payment. And this was decades ago and now back into this conversation again, where can we maybe get a payment to do some no-till. But along the way, right technology around no-till has improved a lot too. No-till is

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much more widely adopted than what it was several decades ago. And so, I think we have to recognize that with time some of the problems or some of the solutions become more practical. And so, we get things to improve over time. And the other piece to that is in the right settings, what might seem improbable, just a few years or decades before, can all of a sudden be unlikely given the circumstances that we're trying to address, the political challenges or the political opportunities, I wouldn't, thinking about, you know, carbon market mandates, you know, they seem improbable today, but you could see a scenario where those might be much more appealing in the future, given how things might play out.

**Brent Gloy**: Just listening to this discussion of it. It makes me think so ethanol happened because of a whole bunch of wild things that we would have never thought possible happened. We had a terrorist attack in the United States. Before that, I don't think anybody really thought or cared about where their oil came from. It was there, it was cheap. It was - nobody really worried about it. We also had, the, you know, environmental groups kind of got behind it. And then you had some other things happening in the petroleum industry or the gasoline industry that kind of got the ball rolling.

And so, it was like you ask about a tipping point and it's weird because all these things kind of happened at the same time. Almost seemingly random. In hindsight, we can tell a narrative that, you know, it all happened for these good reasons and the technology was there, and the market came, and the bank is financing all this stuff. But it reminds me of the Escaping 1980, lesson that we, we talked about, and we said, "Well, you know, but the 1980s are never going to repeat themselves. The set of circumstances that gave rise to the farm financial crisis are never going to exactly repeat themselves." And probably those set of circumstances that gave rise to the RFS are probably never going to exactly repeat themselves for carbon. But what we do know is that a lot of things will have to come together for that policy to happen.

And it's really hard to, I think, predict how will happen other than keeping track of all these different undercurrents, and I'd say we're closer now than when we were, whenever I was writing those papers on biochar, which I think was like, you know, the early 2000s. We're closer now than we were then. And, I think people have still been working on those things. And so eventually when the conflation of events will happen that, it'll take off.

It will be interesting to see how carbon evolves and how those markets evolve. But what, what I think we know is that it's going to take some kind of bigger tipping point, I think, than we've had so far to push it into action. I think we're close, but we don't quite have enough momentum yet for society to move. And in many ways, that's what it was like the RFS, you know, ethanol was, you know, we knew how to make it and all those other things were there, but we had never really gotten to real policy until there was like that tipping point, that push, that got us to head in a direction of a federally mandated policy.

And part of that push was MTBE and part of it was geopolitical uncertainty, terrorist attack in the United States, and so it took that big push to get us to take that step off of the point into one

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of those directions. And for carbon, I don't think we've had that yet. I don't know when it will come, but I'm guessing it will at some point.

**David Widmar:** So, you never want to underestimate the power of big investments, government policy, and a long time horizon. A lot of things can change. And if you have a lot of money, a lot of policies in place in the long-time horizon. And so, I mentioned earlier this idea of I remember reading about carbon markets and carbon credits from no-tilling when I was in high school. I think some of those challenges are still there. So, it's easy to sort of sit back and say, “Oh my gosh, I've been thinking about this for a long time.” But what has changed, especially in the last year or in 2020, 2021 is the - we've had a lot of time passes. So, the work has continued probably silently. And so, there are great scientists doing sort of foundational research on carbon and carbon markets and all of this work long before Joe Biden mentioned it in his State of the Union address here in 2021.

But the thing has really changed is now we have more money going in this, in this space of carbon and carbon markets. We have, policies, you know, knocking around the edges, sort of kicking the tires, figuring out, you know, how does policy really get involved? I think that's what policymakers are trying to figure out. What do we need to do to sort of help move this? So, I kind of start to feel a little bit, like we talked about with ethanol. It went from highly unlikely or improbable to almost inevitable. It's not inevitable. I'm not saying it is inevitable, but what we're moving closer to this end of the spectrum, because we've had time to solve problems. A lot of money has moved into this space in the last few years and policymakers are really starting to size this up a little bit. It was also around the policy side. What I think about is, I get the impression, at least when I'm thinking about carbon and some of these meetings that, you know, we're at like 2007, With respect to the RFS.

Like it's, we're really on the cusp of something really great happening. And we might actually be way farther back in the cycle. I can think of this as a football game. We're like at the beginning, of the beginning of the first quarter, it is very, very early and that really stuck with me is there's a lot of moving pieces here. I guess in history you just kind of say, “Oh, we passed the RFS in '05, and then we did it in '07 and life was great.” But that was actually a long, a long policy process. It started well before the RFS and state level policy really drove the RFS in that big energy companies, big oil was trying to avoid this patchwork of state level regulations.

And so, this would have got the RFS for 2005. When they're looking for the MTBE-substitute, that was a huge catalyst for sort of them being on board and more receptive to this. And I think what's interesting is with carbon we're starting to see some state level initiatives. And so, I think that would be something really interesting to keep an eye on is, what are these state level initiatives? How they move forward and does this pave a path for more federal policy down the road? But again, it's early in the process. It may look a long way down the road.

**Brent Gloy:** Yeah, that's the thing that really jumped out to me is you know, we, I think, we knew that the RFS kind of came together really quickly. And it was obvious after it got done that

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there was a lot of, you know, hindsight things that you're going to be like, "Oh, that might be a little bit of a problem here. It's going to have a lot bigger implications than we thought it would." And I think carbon is like that on steroids because it's so much bigger and I think it's been - it's more complicated and it's probably even less well thought out at this point. It's just a, it's fascinating. Some of the stuff I remember working on - like methane gas reductions back when I was at Cornell and biochar. I wrote some papers on biochar when I was at Cornell or probably, they get cited more than anything else I ever did. And it was kind of like, well, we did that and it kind of just disappeared for like 10 years and now it's back and they see it. And, you know, I saw an article the other day about it as a potential thing that would fit into carbon sequestration. And I, it's just really interesting to think about and probably wonder whether we've really thought all this through even close to good enough because it's a so much bigger policy than ethanol.

And I think in carbon, this is one of the things that we're focused on now. What's the payoff going to be? But the reality is that if you want people to do this stuff, you're going to have to, you have to have an incentive to do it. And the fine line is, when does that incentive become so big that it drives everything? It's just that fine line of is it enough to incentivize anything or is it enough that it really drives, you know, massive change? And I think that's a hard line to walk. And we'll probably miss it because it's really hard to get something to come in at the margin.

**Sarah Mock:** I wanted to give David and Brent a last chance to talk about this very thing, the idea of what it could possibly look like to get ag carbon markets and ag carbon market policy, right, given all the limitations that are currently out there.

**Brent Gloy:** At the end of the day, every party in the chain has to, you know, do what they're doing to hit the rules so they can get paid to produce the product so they can get, you know, paid. And that all has to add up to actual, you know, in that carbon sequestration for society to get that benefit. But along the way, it's the individual incentives that matter. And not necessarily the big picture and especially the way we're doing it with industry-led stuff. I mean, you know, Google wants to put a sign on their website that says they've been carbon neutral since 2007, why? Because, you know, I think it matters as part of their brand and their image or maybe they don't want people to complain about all the energy they use. So, they're trying to counteract it or whatever it is. You know, they have a private incentive and, you know, I think a lot of their employees probably have in their hearts or, you know, a goal that they want to reduce carbon emissions. So, it makes them feel good to work for a company that does that. So, they're getting their incentives too. And I think the real question though, is does it, is it actually doing what you know, society wants it to do? And that's a much harder lift. And if it's not designed properly, if you don't, I think if it's an industry led policy, it's less likely to result in those emission reductions, but not for some nefarious reason, it's just, it's just, you know, everything will be optimized according to those incentives. And whereas if it's policy, government policy, it's more likely maybe to be lined up to maximize that social goal.

**David Widmar:** One of the things that I think about is not all policies that we know are good for the environment and even maybe good for climate change are good for carbon are going to make

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a great carbon market solution. I think maybe no till, for example, or cover crops, those might be examples of practices that are going to be things to fit into the mold of a carbon market. Now that isn't to say these aren't good practice for the environment or for society as a whole, and maybe society as a whole wants to pay for those in some way, shape, or form. It's just recognizing that it might not fit nicely in the traditional frameworks of a carbon market, as we've, as we've thought about them.

And so, we saw this kind of debate, or this discussion play out and again, triangulating across the experts throughout the season. And it reminded me of an idea that I learned from Dr. Otto Doering, at Purdue University. He was a great professor and one of the really interesting lessons that I learned that stuck with me for a long time, he shared this idea of intrinsic versus extrinsic validity.

And the idea of intrinsic validity is something that is very replicatable. It's very scientifically proven - if you do X, then Y happens. Think of it as like these carbon cycles or this big process. if you do this practice or don't do this practice, it pulls this much carbon out of the atmosphere or sequestered that this much into the soil. So very solid intrinsic validity. But on the other side of the coin often is extrinsic validity. And it's this idea of these things really resonate with society. They resonate with individuals and it's going to be able to incentivize those changes at the individual level. And so, there's always sort of this debate between intrinsic validity and extrinsic validity when you see a policy, or you see a decision before you. And I think in carbon right now, we have a lot of folks maybe from the scientific community or the governance side saying, "We have to get the science right, we have to make sure that these practices sequester the amount of carbon that they're getting compensated for." And I think that's important, but I think that the record has, on the other side, there are programs underway to really motivate producers, to make changes and move the needle. And we're probably never going to be able to completely satisfy that internal modeling, that intrinsic validation. At some point we still have to start to move and you're going to see the momentum start to pile up for the, you know, these programs that incentivize behavior, or they create some sort of change.

And that's going to be a debate that we start to see play out potentially pretty quickly and then there's going to be debate is, a debate like, "Whoa, was this the right thing to do or the wrong thing to do?" And so, there's just going to be kind of this constant struggle between the two camps.

I think even internally I struggled with this idea of like, oh, I need to open up this Excel sheet and really crunch the numbers and get this argument ironed out and make sure I get all my data. And sometimes I'm like, "Oh no, make a decision." At some point I need to actually, you know, close the book on this and, and make a decision and move forward.

**Brent Gloy:** So, if you wait around for all of this stuff to be kind of internally validated, the chance of getting the policy through may, you know, disappear. And so, there's moments in time where you get to do things like this. And, you know, as, your guest said on the ethanol deal, like

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they're fleeting, it doesn't happen very often, and kind of the amazing thing was that they actually got it done.

**Sarah Mock:** There's a real tradeoff there, between getting something right, and getting something done at the right time. And whether ag carbon market proponents will be able to thread that needle and get those decisions made in the way that ethanol advocates did, is still unknown.

But the problem is, we want to know the answer to these very kinds of questions, and what's more, we think it's possible. The first step to solving some of these big unknowns is to answer a lot of smaller questions – where the science is? Who the lawmakers and stakeholders are? What's the public interest and appetite? Who wins and who loses? The list goes on. But as our journey through the history of ethanol showed us, it's not so easy as collecting that information and tallying up the answers. Who you get the information from matters a lot, because different players can have completely opposite perspectives. Bringing in a bunch of experts this season, especially those who aren't in the commodity ag mainstream, was one of the really exciting aspects of putting this show together. Not only because they were a blast to talk with, but because there is a lot of value to be had in hearing from well-informed experts whose perspective differs from, we'll call it, the company line. This is because the truth is complex and it's difficult to capture in its entirety, so there's a good strategy here to use when trying to answer tough questions.

Here's David:

**David Widmar:** It reminded me of the idea, the mental model of triangulation and this idea of how do you deepen your thinking about a subject that's complicated, especially like the history of RFS or maybe the future of carbon markets and carbon policy? And the key idea here is sort of like GPS satellites, one data point isn't sufficient enough to really, you know, guide your tractor you need multiple satellites. And those satellites really do a good job when they're looking at the differences between those individual observations, and they try to do that. So, we should look at a lot of different experts and a lot of different viewpoints. I think with RFS, it's easy for ag to talk to ag folks and ag policy makers and sort of get one narrative, but for this policy to make it through Congress and make it through all the hurdles that it has made it through and to be where it's at today, it had to have a lot of constituents and those other constituents had other sort of vantage points. And so, it's really valuable to focus on where the experts have a slightly different version of the story. And that can help us think critically about how complicated and nuanced and challenging it was.

So, I think the really hard thing with triangulation is what do we do with differing viewpoints? And it's just really easy to make piles of these are the things that I agree with and then you sort of scatter everything else around the room. Sweep it around the house a little bit. So, as a decision maker, we have to be very diligent of how we sift through differing opinions. I'll give you an example - if you go to a conference and you have a panel, panelists, a group of panelists on the stage, the narrator, the MC will typically wrap it up like, "Well, here are three things I heard

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from all of the panelists today in today's discussion.” And they highlight sort of three common threads that everyone sorts of agreed on or everyone that resonated with everybody. And it would be easy to do that from this season of the podcast. But I think what you really should do is step back and say, “Where are one or two areas where the experts really disagree? Or how they have a different viewpoint of how things might play out in the future?”

And that's really valuable for us as decision makers because we can use that as a bit of a template or a roadmap as for what may come down the road. As we step away from this season, in a year, or two, or three, or four, for now, you can sort of sit back and say, “Okay, expert one, thought that it could head this way, and expert two thought, you know, plan path B might be more possible.” And you can see how those start to play out. And you can sort of follow that forward as a narrative or as the uncertainties start to resolve themselves into the future. So don't just sort of find the similarities and sort of capture on them, highlight differences, focus, don't focus on the differences, but understand the differences very clearly and see how those differences play out as we move forward.

**Sarah Mock:** Before we change gears here, I wanted to take a moment to check in on the whole idea of comparing ethanol and ag carbon markets. As I said in Episode 1, in some ways, this exercise didn't seem to make much sense. The similarities between ethanol and carbon markets seem kind of superficial, and their differences are glaring, but I think one of the most valuable parts of this exercise, was not finding the places where ethanol offered insights on carbon as much as it was those instances when thinking about ag carbon markets prompted me to think about ethanol differently.

Questions that might not have occurred to me to ask about the RFS and the rise of ethanol, seemed obvious when thinking about it in comparison to where we are now in the ag carbon market timeline. That comparison, in other words, made me think differently about both issues, and in that way, broadened the scope of this podcast to consider a lot more possible futures, and in my mind, broadening that scope is the best way to make predictions about anything more likely to be accurate.

This is important to mention, I think, because it helps us get to a deeper takeaway from this season, for us and hopefully for you too. Ethanol is a story I felt confident I knew, and it wasn't until it was scrutinized side by side with carbon that I realized that the story was way more complicated, and that was my bias becoming part of what I knew.

So let me take a moment to put all of the biases I've detected in my own thinking on the table. I definitely illustrated some availability bias – where the information I could most easily remember about ethanol was what I knew was relatively simplistic. I'm also dealing with some selection bias – the simple narrative I first learned about ethanol is the story I pay the most attention to, and the more I hear people discuss the same details, the more I feel confirmed that my simplistic narrative was correct – confirmation bias. And I definitely experienced some elements of the what's called the Dunning-Kruger effect, where I simply wasn't aware how

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limited my knowledge on the subject was. I felt confident in the relatively small amount I knew, because I didn't know how much there was to know. David will talk more about this in a minute.

The good news (I think) is that, though we all have biases, it's possible, and important, to challenge them. David, Brent, and I spent most of the rest of our wrap up conversation discussing biases - how they've shaped the way we think about ethanol and ag carbon, and what we've learned about adjusting for them going forward.

**Brent Gloy:** I think an important thing to remember. And I try and tell myself that every now and then. I think economists by nature are pretty pessimistic. We tend to see all the different ways in which something can't work or reasons why it won't work, or the reasons why it's a stupid idea. And I think that's part of like, you know, your training as a professor at a research university. And you just, you spend all of your time, you know, looking for ways to poke holes in people's arguments and to tear it apart. And it's a really negative, I don't know, a really negative approach to things. So, I think, I do think, like you said, I think the whole reason RFS makes me a little bit optimistic, and I think we need to be optimistic, because, you know, doing nothing, or just being pessimistic about all of it is probably not going to accomplish much other than maybe if you want to just have the status quo and there's problems with the status quo too. You can sit there and go, "Well, you know, this is, could be bad for all these reasons." And the current situation could be bad for all Y-reasons. So, I don't know that there's a lot of cost to being optimistic. I think it's, there's, there's in saying that we have to be prudent in building policies. Avoid some of the mistakes that we've made in the past. And that I think is the most important lesson is to just try and do it so, it doesn't, it doesn't cause all these problems. We don't bake all of these problems in that we did in the past.

**David Widmar:** I think sometimes we have to think about what does it mean to be critical, skeptical of something? And I think Brent and I personally have thrown these terms around to describe our sentiment or our thoughts about some of these technologies or these ideas around carbon and that doesn't necessarily mean we're pessimistic. I think that even pessimistic is probably needs to be defined, but I think the idea here is there are some big question marks out there for us. And so, I think one of the goals of this season was to help highlight some of the challenges that the decision-makers, or the individuals, or the policymakers, everyone in this space has to sort of overcome and move through. I think one way to think about this is borrowing the framework from the Ag Forecast Network. What's the probability of agriculture being able to sequester X tons of carbon in the next 10 years? I think that might be a way of framing up this uncertainty. And you can do this probabilistically thinking, "What's the probability of this happening?" And you can change your expectations over time.

And I think my forecast of this hypothetical question would have increased as we sort of dove into some of the uncertainties a little bit. And learned from all these experts in these differences of opinion. So, if you're an individual listening, I think that you should think about what is the big picture goal? Is it agriculture being able to sequester a certain amount of carbon in the next

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five or 10 years? And what's the probability of us making progress towards that? And highlighting some of the key variables that have to come into place to make that a more likely or less likely reality.

**Sarah Mock:** In the process of making that analysis and gathering that information, however, it's inevitable that bias, and more generally, our feelings and perceptions, will creep in and play a role, whether or not we intend them to. Putting in the work to interrogate those feelings is critical if our aim is accuracy. In short, good analysis includes recognizing why we are attached to certain stories and ideas, and why we are quick to dismiss others.

**David Widmar:** The first thing that comes to my mind is a tagline we like to use is to “be your own guru.” I think one of the things we have to be careful with, especially in this space is there's just a lot of people telling you how you should feel about different policies and different ideas that are circulating. So, you're going to have to kind of roll your sleeves up a little bit and dive into the details a little bit and really understand the implications for your operation, for your business, and then how you think that this should impact the future of society as a whole. Another thing that comes to mind is the Dunning-Kruger effect.

The Dunning-Kruger effect, it's well-documented. It's this idea that sometimes we know, we learn just a tiny bit of information and we feel very confident about a conclusion. We feel very confident that we're a subject matter expert. And then what we also find out is, as you start to learn more, the more you learn, the less, you know - we've all heard that. But as you start to learn more about a subject matter, your confidence starts to drop. And in fact, the curve goes up really fast and down really fast for the first little bits of information. And so, they call it the valley of despair. So, a lot of folks listening might feel like they're in the valley of despair, about carbon sort of - we spent about nine hours sharing ideas and so, it kind of can feel overwhelming. But how do you get out of that valley of despair? You sort of keep probing and prodding and digging into those areas that are most relevant to you, most relevant to the decisions you're going to make. And you, you realize that you're probably never going to be as confident about, is this a good or bad idea? Or is this something that we should or should not do? As you were as an armchair expert the first time you heard about carbon markets. Maybe that was, you know, me as a high school student thinking about carbon markets as it pertained to an FFA speech. It'd be funny to go find some of those.

Actually, my grandmother shared a speech I did write for the FFA when I was talking about precision technology, it was in the '90s and 2000s and I was very confident. I wrote about that. But as I learned more and as I age, there were statements in there that I just wouldn't say today. So, I think a lot of times, we have to recognize that we just have to keep probing and drilling down and understanding that the lack of confidence, or the uncertainty, or the unknowns is probably a sign of, of really understanding the complexity and the nuances of the decision and we have to get comfortable with that. We have to be comfortable with not having all of the data or all the information that we would like to have.

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There's always going to be things that are unknown, things that we can't know, and things that we have to keep pursuing to figure that out moving forward. So, I think for all of us who are listening to this, this is kind of doing our own little Dunning-Kruger experiment - where we might feel like we know a little more than we knew before, but we might be less confident in some of our initial opinions or stances on the issue. And we have to continue to work on those.

**Brent Gloy:** Yeah, I think you hit on a lot of really important concepts there, David, and I feel like we all are very quick to apply our feelings or beliefs to any kind of idea.

I know, after listening to the podcast and hearing from all the experts, I'm maybe I was a little too pessimistic about some of these things. But I think it, I think you're, you're right in that we're quick to form these feelings. We're all armchair epidemiologists or biologists now because of the pandemic. So, we all know more about antibodies than anybody else. And, you know, we don't, we haven't realized what we don't know and how complex it is. And I think of a lot of that is true with carbon too. And so, I think the key is to, you know, withhold your feelings and your judgment, and really try and understand and educate yourself as much as you can before you jump to conclusions about what the end result is going to be. And the, like my moment in this podcast that really, I shouldn't have really like blown me away, but it did is when one of the experts was talking about different types of carbon policy. And she's like, well, you know, we could just, everybody gets like a benchmark score on carbon. If you're below you pay in, if you're above you, you can sell it off. And I'm like, "Well, that's a very" - because I, had been set on this idea of additionality and it doesn't even matter. Additionality doesn't matter if you structure the policy this way and you can have a good outcome with that. And so, it was like a real wake up that - I've thought about this a lot. And I've worked on this stuff a lot. And I was blown away by like, that idea never even really occurred to me. And I don't know why it hadn't, but it was a real wake up call. And so, I think what you're saying, David, with the Dunning-Kruger is that, you know, we need to keep working on it, and learning, and thinking, and being open to changing. I don't know necessarily changing our opinion but updating our - the data and the information that we have about whatever it is we're thinking about, because it's really hard to know everything.

The hard thing though, is that. We can always kind of sit back and throw our hands up in the air and go, "Oh, we just can't know all this." And that never leads to any action. And that's, that's like the professor view of it. We just, "Oh, geez. We think all these big thoughts and the - here's all the different things that could do." But, at some point, we have to do something, right? And we have to like step forward and do things. So, I think with carbon, the question is going to be, what's the best? Of all the directions - you think of yourself sitting on a point and you could go 360 different directions, which is the heading that you want to take that first step in? And I think we can know which directions we don't want to take the first step in.

**David Widmar:** It's also important to recognize how do you update your thinking when you might be going down the wrong path? You can take a direction, but when new information becomes available and the conditions change, how do you alter your course? I think as we were thinking about the future of ethanol, some of the experts kind of laid out some alternatives that

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ethanol's future might have. And so, even within ethanol we've had 15 years of sort of policy here. There are still question marks and uncertainty and where the industry might be going. And I think that kind of ties into, we can be supportive of ethanol. We can think it's been good for our operation. Good for the economy and good for the environment, but we still have to have a conversation about where does that fuel fit into the future? And we have to recognize that the future is evolving, and it could be a good solution. It's just a question of, especially if it's been a good solution for the past, but how does that past solution fit into the future? And how does that move forward? I think that's going to be true regardless of the decisions we make, right. We always have to make decisions and we have to figure out a way - how do we update our thinking? And how do we, given new information?

So, it's easy to point to the problems and it's easy to support something blindly. It's really hard to, you know, come up with a solution and acknowledge all of its warts and imperfections and trade-offs.

**Sarah Mock:** For me personally, this whole season was an exercise in this very work, of updating thinking my thinking. At some point I started thinking about what I know about ethanol and ag carbon as existing in one of four categories – this might get a little confusing, but bear with me I promise it will be worth it. The four categories are - the known knowns, the unknown knowns, the known unknowns, and the unknown unknowns.

The first - the known knowns - that's stuff that I thought I knew, and I did know. The RFS 2 was signed in 2007. Ethanol hit the blend wall in about 2012, etc. The last two categories, the known unknowns, and the unknown unknowns, those I can't really do that much about. Known unknowns include the timing of ag carbon market policy – something I'm fairly confident will come, but don't know when, and don't really have a way of figuring out when. Unknown unknowns are, well, unpredictable.

It's that fourth category that I found I worked on most this season – the unknown knowns: the things I thought I knew, but I actually didn't. To me these are the most problematic because the truth was knowable, and it was only bias (or more generously, time limitations) that kept these ideas unknown to me. In this way finding ways to shake off the cobwebs on old ideas and making sure they evolve isn't just about being a history buff or a know-it-all, it's about staying ahead of what comes next, and not coming out of the next big thing – good or bad - thinking; I could have guessed that was going to happen, if I had only been paying better attention. Over the past several months, I've learned a ton about ethanol and ag carbon markets, and at least as much about identifying and challenging my own internal biases.

One of the first steps I took was to spend some time, whether I was reading an article or scrolling on Twitter, to stop before I hit like or forwarded something to a friend to think, "What is it that I like about this?" More often than I'd like to admit, the answer was, more or less, "It proves that I was right about something." When that was the case, I challenged myself to take five minutes and do some background research from other sources. Essentially every time I did this exercise, I

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found that my conclusion, and the media I'd found and liked, was over-simplified, biased, and in some cases, verifiably false. I was reminded that the world is a complex place, and rarely is complex truth capturable say in 280 characters.

As a jumping off point, if you're interested in doing this work yourself, I'll propose a first exercise. Right now, you're listening to a podcast called Corn Saves America. Why did you pick this podcast? Maybe you're an existing AEI subscriber or you already heard season 1, and the title didn't matter to you. But do you think if the title had been "Corn Destroys America" you would have been as willing to listen? Even if the internal content were identical? Did your bias towards American agriculture, corn production, and your belief in the inherent benefits of both make this podcast more interesting to you?

If that bias was all that was driving you, I doubt you'd have made it this far into this season mostly because this hasn't been the straight celebration of corn production or even corn ethanol, that the title implies. But I hope that here, as we approach the end of another season together, that whether the title mattered to you or not, you feel (or I should say, think) that you've heard meaningful and balanced, if unconventional, perspectives on the ethanol and ag carbon sectors, and that we've done our best to challenge our biases whenever possible, and being transparent about them in the meantime.

**Brent Gloy:** We have more ways today to find things that conform our feelings, beliefs, and attitudes than we ever have before. So, if you think corn is the superhero, you have lots of information there. If you think it's the villain, you have lots of people there that you can find who will comport to your ideas.

But at the end of the day, I view that I think corn did make a real benefit and it really did make things better. I think with RFS not dramatically so, but I've viewed it as the superhero - kind of wounded - but it's still, we're better than we would have been without the RFS, I think.

**Sarah Mock:** So where does all of this leave us? We'll close where we started, with the question I asked a question at the very, very beginning of this season, about whether or not corn really could save America from environmental calamity. The best answer I've got for at this point is, I think the RFS achieved something kind of extraordinary, as a market and policy, but was that achievement saving the country or the world from environmental degradation? No.

When I think about ag carbon, and it's potential to mobilize commodity grain production as a tool for carbon sequestration, I worry that the story will be much the same. I just can't shake what Mitchell Hora reminded us –that agriculture, grain farming included, is a net-emitting activity. How much carbon would have to be sequestered in soil, simply to offset the emissions released through the use of carbon fuel-derived ag chemicals, diesel, and in shipping agricultural products? We don't actually know a good answer to this question. But I feel confident that it is, at the very least, far more ag carbon than we are currently attempting to sequester. So, if I were

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answering the same question, can carbon-sequestering corn save America or the world from environmental degradation? I think the answer is still likely - no.

In the case of ethanol, a technology was sold as a way for agriculture to solve a big social, economic, and environmental problem, but in the end, the biggest beneficiary of the RFS was arguably farmers who, from 2007 to 2013, experienced some of the highest prices ever recorded for commodity corn after a decades-long slump. Though the promise was that corn would save America. In the end, America saved corn.

That ethanol failed to meet its environmental promises turned out to be relatively unimportant. I don't know if the same could be said for ag carbon markets, because the biggest difference is, you can't put a carbon credit in your car, or do anything with it, except buy and sell it.

I think there's a deeper question there, at the intersection of ethanol and carbon markets. Both promised, in addition to other benefits, to transform the economics of commodity grain production. But a reality there that we don't often reckon with is – what is it about the commodity economics that isn't working for us? And given all we know, is a new market really capable of altering the fundamental incentives in that system? Whether we prioritize the environment, the economics, or both, ag history has shown us again and again that the answer is no. The ag economy is cyclical. And it takes more than the Latest Big Thing to make lasting change.

Well, this has been the final episode of Corn Saves America, season 2 of AEI Presents. We want to thank all of you listeners who have been following along this season and last season. We hope that you enjoyed all that you heard. I want to say a special thank you to David Widmar and Brent Gloy who trusted me to tackle this podcast and these two difficult and controversial topics and do them justice. I appreciate the opportunity to get to do such a fun project.

AEI Presents Corn Saves America is a production of AEI Premium. Produced and edited by me, Sarah Mock, with special thanks to David Widmar, Brent Gloy and Sarah Hubbard.

Our music is by Valentina Gribanova and Boris Skalsky.

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