Corn Saves America
Episode 8 – Shift Happens

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

Over the last seven episodes, we've tackled a lot of the key events and controversies around ethanol and carbon markets. So, today, we're going to talk about a last few issues looking backward as we prepare talk about the future of ethanol. Our focus today, broadly, is what's limiting corn ethanol, first, we'll tackle the public discourse around ethanol and the long-term economics of the RFS and its effect on land values. Then we'll get into today's hot topics– namely small refinery waivers and other policy shifts.

So, in recent years, the corn ethanol sector has become embattled. It faces economic, political, and environmental criticisms, largely from within those groups that helped bring the RFS to life in 2005 and 2007.

Today, we're going to take some time to understand those criticisms of ethanol, and to understand how the last fifteen years of shifting priorities and expectations, has backed this former darling into a corner and what that might mean for the future of carbon markets. It's worth noting, I think, that the earliest criticisms of ethanol weren't about its cost or its environmental impact, but about its quality as a fuel. Brent remembers one proponent of this critique.

Brent Gloy: One of the first criticisms I remember about ethanol was put forth by a colleague of mine at Cornell, not in the same department, but a professor at Cornell called David Pimentel and David, had this idea that, one of the really important things is concept called energy balance and the idea that, while ethanol is stupid, because it takes more energy to make it, then it gives us, and he was really good at communicating that idea with, lots of people, influencers and, reporters and whatnot, because it's a simple idea, right. Is what you get out of it more than what you get into it? Seemingly it makes a lot of sense. I always thought that was stupid criticism, frankly, because, if we judge crude oil on that metric, it probably takes more energy to get it out of the ground and refine it than it, than you get out of it. But the simple fact is that you put it in your gas tank and makes your car go, and there's not many other things that you can do that with and on top of it, a lot of times we can produce it cheaply enough that it made economic sense to do so.

So, economics should be the driver of it, not, you know, the concept of energy balance. The market will determine that.

Sarah Mock: I asked Scott Sklar about the energy balance question, he's done a fair amount of these studies himself, and he, in most senses, agrees with Brent saying that though ethanol had a poor energy balance in the 1970s, by the early 2000s, it was quite competitive with fossil fuels.

Scott Sklar It's much, much less energy - a lot of energy balance studies that show it's very positive. Frankly, farmers are not as energy intensive anymore as they were 40 years ago. So yeah, they were using 30 to 40% more energy because it was cheap, and it was oil based. That's just not true anymore. You actually have a pretty good energy balance on it. But when you look at energy balances as I do, energy balances are horrible for conventional energy too. So, it's not like you're creating something new or you're being, it's an aberration. We use lots of energy. We have, you know, thousands of thousands of fracking wells with all their junk, just sitting there abandoned and leaving it up to states and cities to counties for billions of dollars to do it. It'll takes a lot of energy to clean all that mess up.

Sarah Mock: This energy balance debate is far from the most impactful, or the most heated, about ethanol's costs and benefits. The most mainstream of the anti-ethanol narratives is the familiar food vs. fuel debate, or the idea that growing corn for ethanol – which was subsidized in various ways by federal programs, was competing, and winning, against crops that could be used to feed the poor, in the United States and around the world. The problem with this argument, Brent says, is that it simply misunderstands the economics around land use and food production in American agriculture.

Brent Gloy: And all of a sudden, you're like, "Oh geez, I don't like it. You know, taking food out people's mouths." But people weren't willing to pay enough to get that much food to start with. So, we wouldn't have anyway. It's kind of a silly argument, I think because, you can have both. It's just a question of who pays what. And in the idea that people are hungry in the world because of ethanol, I thought was absolutely silly. That's not why people are hungry. There are lots of reasons why people are hungry and very little of it has to do with the price of food in my opinion. I think most of it is due to a lot of other unfortunate factors. So, well, but it's catchy and it's political and you say, "Hey, this policy is causing this," well not really, that's not why, there's all these problems other places. If we remove it, it's not going to make that problem go away. So, people I think get misled on these arguments. They're always more nuanced and more complicated than they might appear on their surface.

Sarah Mock: It's worth considering that even a doubling in the price of commodity corn, which happened during the ethanol run up in the mid-2007, would have a negligible price impact on say, a box of Cornflakes at the grocery store, because the total price of that box that is derived from corn, is a few pennies. There are other criticisms too that have come into vogue over the past 15 years.

Brent Gloy: It's causing a large-scale deforestation and large land use change in the world, which is going to release huge amounts of carbon and burn up the world. To some extent that's, I mean, I'm over exaggerating what people are saying, but the idea was that, well, you know, the

only reason we grow all this corn is because of ethanol policy. And if we didn't have ethanol policy then Brazilians would stop cutting down the rainforest, then life would be grand. And I think that's nonsense too.

At the margin, it has some impact for sure. If you make that price of corn higher than it otherwise would be it probably has some impact but removing the Renewable Fuel Standard is not going to bring it in to, the chain drags that are clearing the Cerrado in Brazil and South America they're going to continue to do that, because they can, and because it's economically profitable until those countries decide that they can afford to preserve that land and that resource, that's probably going to continue to happen with or without ethanol.

Sarah Mock: There are two slightly different versions, broadly, of this land use change criticism of ethanol. Brent just outlined the first, that demand for corn for ethanol is pulling non-farm acres around the globe into production. But there's a more local version as well. Many, especially in the environmental world, say that the ethanol sector's increased demand for corn has meant more acres planted to corn in the U.S. that would otherwise be used for other, perhaps less environmentally impactful crops. Interestingly, however, when we look at the data, corn production has not crowded out nearly as many, wheat, or other small grain acres, say, as increased soybean production has over the last 40 years. It's hard to deny however that high corn prices driven by ethanol demand, plus the benefits of corn and soybean rotations have transformed the face of Midwest agriculture in recent years and significantly reduced production of alternative crops. Here UC Davis' Dr. Aaron Smith:

Aaron Smith: As we get increased corn production sort of increased intensification of agriculture, we get conversion of non-crop land to crop land, and that creates its own pollution issues. Runoff, increased fertilizer use means increased runoff and increased pollution of waterways. And it means, increased carbon emissions, even from the fact that you're expanding land use and all kinds of other potential environmental effects there as well.

Sarah Mock: Arguments like these may have been at least partially averted if the cellulosic industry had become a more dominant supplier of fuel. Its growth might have relieved the competition with corn and other feed stocks that were part of the food chain. It's worth considering however, even with 15 billion gallons of ethanol being created annually, the price of corn was still quite low in the middle of the 20-teens, there was plenty of cheap grains to go around at that time, too much, arguably. And it didn't have a truly significant impact on hunger in the world.

The popularity of the food versus fuel critique, however, peaked earlier than you might expect, in 2008, and though it was prominent again in the 2010–2011 timeframe. It, along with many of the other criticisms, has faded significantly since the industry hit the blend wall in 2013 and growth in ethanol production plateaued. In fact, many of the early critics of ethanol seemed to lose some interest around this time, perhaps thinking that ethanol was now in an inevitable decline and thus they could turn their attention elsewhere.

These criticisms echo a lesson we learned last episode, that when a policy is costly, arguments against it, made by those paying the cost, will multiply. From the energy balance argument to food vs. fuel, to today's land use change battle, the blame for many problems has been pinned compellingly on ethanol, and only faded when the sector itself started to face hardships.

This will be important insight as we peer into the future of carbon markets, but before we get into that, let's talk about what ag economists were paying attention to, while opinions were shifting around ethanol.

Brent Gloy: Ag real estate values really started to go up and farmland values in particular were going up. And prices started going up like 20% above anything we'd seen. And you're sitting there going, "Well, how, how on earth is that going to make sense?" Because even the commodity price, I don't think it – they'd gone up a little bit, but they were not, up to like 2012 levels at all. And what transpired is that we had a series of really lousy crops in the United States, culminating in the drought in 2012, where we produce significantly less commodity than we normally would. And we had to ration prices, and that's where it really got interesting because all of a sudden how much can the ethanol plants pay versus how much can say cattle feeders or exporters' pay for this commodity? Because the ethanol demand was really inelastic because oil prices were high, so it was going to get used.

Sarah Mock: Inelastic, here, is an economic term, meaning that quantity demanded is not very responsive to changes in price – think food and energy, things you buy pretty much the same amount independent not matter how expensive it is. We've talked a few times now, about this effect of tying agriculture to an industry like oil, but we've focused mostly on the short-term price effects. What Brent is pointing to here is the slightly longer-term effects that go deeper than commodity price, namely, how sustained growth in demand, even for just a few years, can impact the fundamentals of agriculture, all the way to land prices.

Brent Gloy: And I think in the land market we really saw prices shooting up prior to 2012, but 2012 being the year - 13, 14, - where they really peaked. And we were writing papers about are these expectations rational? Is farmland overpriced, over-valued? Are we setting ourselves up for another crash like we had in the 1980s? I was going around speaking all over on land values because they've gone up so much and people wanting to know why and whether it made sense, but that's when the law's full impact was kind of felt. I think, to the maximum.

Sarah Mock: Aaron offered some really valuable perspective on this question of how the RFS mandate affected agricultural land values. He argues that the question of land value, and whether or not land is overvalued is a terribly complicated one, it can be expected that the RFS, at the very least, inflated the value of farmland beyond where the price would likely be in a strictly free market without demand-forcing intervention from the federal government.

Aaron Smith: It's overvalued in the sense that a chunk of the money that you're getting is coming from taxpayers say, either directly in terms of transfers or sort of indirectly through these mandates, or other programs. And in that sense, the, the production is overvalued. And that's why, land is overvalued versus if you didn't have those programs, then, the value of land would be lower.

Sarah Mock: Aaron argues that when policies result in increased demand, and thus transfers or additional income to farmers, that cash inevitably ends up capitalized in farmland.

Aaron Smith: It's got to go somewhere, right? So, it, know, you could imagine maybe if farmers have more money, they might buy way more tractors, or they might go eat more at a local restaurant. But, at the end of the day, most of the value that comes in, goes to the value of land. Cause the value of farmland is equal to sort of the expected future profits that you can earn off that land. And so, to the extent that you can expect to be earning a bunch of future profits from farming that land or owning that land, then you're going to pay more for it. So, when you see more and more money flowing in from taxpayers or wherever to agriculture, most of that in the end is going to flow into the value of the farmland.

And one thing that's really compelling to me is from one of my colleagues showed this plot of total profits. So, this is just the profits from the business of farming in the United States over the last hundred years. And it's basically constant. In real terms, inflation adjusted terms, and that's kind of what we would expect that, you know, farming is the kind of business where anybody in principle can kind of come in and start and learn the skills and start doing it.

And so, it's not like you sort of have an exclusive monopoly that I'm the only one who's allowed to produce corn, so I can get a big monopoly profit from it. And so, your profits are always going to be not too high or not too low, because if it's too low, people will exit. And if it's too high, people will come back in and bid the profits down. Where does all that extra money go when the value of crop production goes up because of, you know, whatever reason? Predominantly it goes into the value of the land. Higher land values make it harder, potentially for people to access the capital to be able to farm land, or to be able to rent crop land.

Sarah Mock: This idea that increased demand and thus income in agriculture, no matter where it came from, eventually ends up in farmland values, has some major implications it means that in general new markets cannot provide an indefinite stream of profit for farm businesses. There may be gains to be made in the short term, but in the long term, the market eventually reasserts itself. Here's David to put a finer point on it.

David Widmar: We're always looking about ways; how can we generate more income? How can we, you know, increase our profitability? And I think in the long run, if there are profits to be had we have to recognize that a lot of those are going to get priced into the farmland.

And so, in general, those get capitalized in the farmland markets. And so, if you're a producer listening to this, like ethanol wasn't a few decades ago, this isn't going to be a quantum leap in your business model that's going to generate perpetual returns for you for forever. You're going to have to pay more for farmland. You have to pay more for cash rent in the future, and those will eventually sort of work their way through the system. There's always kind of this mirage or this idea that like, we're going to go find this new demand source it's going to solve forever. It'll solve our low commodity price situation, or it's going to solve our low farm income.
And one of the economic realities is if something's going to significantly change the demand of agricultural products and it does so in a way that creates a significantly stronger price reaction that's going to incentivize producers in the U.S. and around the world to plant more crops. And there are a lot of data about that. And so, when there are economic profits that occur for several years, we have a supply response. We increase agricultural output, not only in the upper trend of more yields per year, which is intensification, but we also extensify, we add more acres.
Eventually the cure for high prices is high prices. And so, we get back into this oversupply situation, which we've had, you know, remnants of between 2016, 17, 18, 19, and even most of 2020, we have this sort of, how are we going to deal with this oversupply situation? So, I always think it's hard for producers to build a business model on the anticipation that demand is going to somehow improve in some meaningful way.

If that's the case, there are I guess a few things that we know confidently as economist, if there are strong profits, we will increase agricultural output around the world. And if we do that, eventually we will get back into an oversupply situation and there are going to be lean economic returns.

Sarah Mock: In the long term, then no matter what ag commodity market you're participating in, the product you're selling will eventually become just another essential revenue stream, necessary to compete.

David Widmar: Perfectly competitive markets, as economists, we like to say that in the long run, we expect the profits to be close to zero. And so, the cost of production will roughly equal the price of the output. Now those are economic costs and economic costs are, generating a return to all the assets. And so, we're paying all of our labor. We're paying all of our land; we're paying all of our variable costs of production.

And I think that's important for producers to, to realize is that in the long run, we expect that to be a pretty tight return. Now there'll be periods that have big economic profits and periods that have maybe small economic losses, even big economic losses, but we expect there to be market forces that eventually get those to converge back towards each other.
Now, producers don't often think about economic costs, right? They're worried about, accounting profits or cash flows. And so, producers also need to step back and realize, "Okay, where am I at relative to my, maybe my cash flows? Or my accounting profits relative to maybe those longer-term economic costs?" And that's why it's important to sort of always think about your business

in a few different frameworks with respect to time and different measures of returns and profitability.

Sarah Mock: This is, I think, one of the most important takeaways of this podcast. Though ethanol did transform the economics of commodity grain farming in the U.S. For a few years, today, (or more starkly in recent years) we are, in many ways, back to where we were in the pre-RFS years, with too much corn, and too little demand for it.

When we think about potential new agricultural commodity markets then, like say, ag carbon, we should keep in mind that the same rules likely apply. Sure, carbon credits may alter the economics of farming, at least, in the short term, as it takes time for new revenue to get bid into capital assets, like farmland, and for costs of production to creep up. However, we should expect that this boom will not last forever. And over time, we should expect fundamental commodity economics to reassert themselves. And for new carbon credit sales to be less of a margin booster, and more of a cost-of-production-returning crop on farm's balance sheet.

Why? Because this is how commodity markets are supposed to work.

Before we get bummed about the long-term though, I want to dive into what is actually in the ethanol space today. Because it might surprise you to hear that, despite the fact that we hit the blend wall nearly a decade ago, advocates did not see it as a mark of ethanol's doom.

Scott Irwin, ag economist at the University of Illinois, says that despite the blend wall and the political and economic turmoil that the industry has faced over the last decade, rumors of its so-called decline, are largely exaggerated.

Scott Irwin: Since about 2014 - the last six, seven years - you've not really seen any sustained periods of huge losses, nor have you seen any sustained periods of huge profits like we saw in 2013, and part of 2014. Despite everything that is happening, it's remarkable. How by and large, the status quo is holding right now for ethanol.
So, when I say that, just a basic couple of facts to keep in mind, one is that the vast, vast majority of ethanol consumed in the United States is in the form of E10. All of the political heat surrounds the higher blends – E15 in particular and also E85. But even through the worst of the pandemic, the aggregate blend rate for ethanol held it a little over 10%, and that hasn't changed in a long, long time. So, we are in a steady state for the ethanol industry, as far as, E10 is concerned in this sense.

That 10% seems very stable regardless of the enormous policy and economic uncertainties that we face.

Sarah Mock: Part of the story of the past several years involves efforts from within the industry to push through the blend wall and find new markets for U.S. ethanol.

To help me explain, I want to introduce you to one last new expert, Jarret Whistance, a research scientist at the Food and Agricultural Policy Research Institute at the University of Missouri. He studies U.S. biofuel markets and policies and has paid particular attention to the last 5-7 years in the ethanol sector. He offered an interesting addendum to our blend wall conversation, namely, that at the time, and even today, some believe the blend wall is not as solid as it's been portrayed.

Jarret Whistance: That expectation that we could push through it and be able to - it was saturated at E10 for a little bit, but maybe there's a possibility that we could continue to go and continue to use this fuel domestically. I think as the blend wall kind of held its own for a while, I think then we started to see that sort of turn to, "Okay, can we do something else with this?" And so, there was kind of that pushed for a little bit, and there's still a push, I think. There's still a lot of emphasis on ethanol exports, on the ethanol supply side. One thing that, you know, again, a few years ago, one of the big stories and some of that we were looking into and trying to plan for it was China announcing a 10% mandate for ethanol that was supposed to be in place by 2020.

And that was seen as potentially a game changer, because that would be something where, you know, to turn it around that quick this was a chance for U.S. ethanol to really step in and get a big share of that market just right out of the gate. And then it didn't really quite pan out the way everybody kind of thought it would. Similarly, Brazil has their own mandate, you know. One of the things that we've, we're still looking at it a little bit, there's still a little bit of potential here with their new RenovaBio policy. Now that opens a bit of a door where they can, they can potentially ship it down to Brazil to help meet Brazil's policy.

Sarah Mock: In addition to a focus on exports, there's also been a big push for higher ethanol blends, with a major battle in recent year revolving around E15, which could not be sold year-round due to air quality regulations. But even when we threw E85 in the mix, none of these alternative markets for ethanol have been particularly successful in raising the overall percentage of the fuel supply contributed by ethanol. But this doesn't mean they've declined. Here's Scott Irwin again.

Scott Irwin: Right now, the higher blends and ethanol are just a few hundred million gallons despite all the political attention that they receive.

And the other thing that I think is important to remember is that while the ethanol industry has had tough times, particularly, around a year ago, but almost exactly around a year ago, the ethanol industry started a pretty rapid recovery in prices and profitability. So, those plants that were still in operation for all of 2020, probably actually made money on that over the year. And so, what's happened recently has not been kind of as dire to the ethanol industry, as I think a lot of headlines would suggest and, otherwise E10 blend rate is holding steady, and we've pretty much recovered back to 2019 levels for gasoline use.

Sarah Mock: Scott's analysis here suggests that, despite all of the headwinds the ethanol industry has faced in recent years, they seem to primarily have affected the sector's

growth, rather than its ability to maintain its 10% share of the liquid fuel market. And there have been some significant headwinds, well beyond mere criticisms and erosion of public popularity. Our experts pointed in particular to the growing number of small refinery waivers granted, in particular, during the Trump administration to refiners who claimed that meeting their renewable volume obligation (by blending ethanol or buying RINS) posed an unreasonable hardship to their business.

These waivers allowed refiners to avoid blending millions of gallons of ethanol. Seth Meyer says this has created tremendous policy uncertainty, but the key is to understand that the real impact to worry about is not in the short term, say, in reduced demand for corn, the real problems, he says, come into play in the long term.

Seth Meyer: From a farmer's perspective, farmers think that the very short run policy actions affect them in terms of the corn growing, I would argue what's happened is the longer run policy instability in terms of small refinery exemptions is how we've gotten where we're at. So, you can go back, and you can look at that shift in small refinery exemptions, where they actually went three or four times larger for a few years than they were- that backs off the mandates. It backs you off the blend wall. It removes those signals to think about how do we achieve higher level blends? So, I think the policy as implemented over the last few years has made it harder to achieve the goals that were envisioned to begin with. Because, you get these signals about, "Well, we're going to issue a bunch of small refinery exemptions, RIN prices are going to fall. Well, okay, what's the point of putting in a blender pump? I'll wait and see where we're headed." Which just gets you to the point of, "Okay, how much ethanol can we absorb? What should we set the RVO at?" Well, we have this many blender pumps. We think we can absorb this much. So, it becomes a self-fulfilling prophecy when you have this type of policy implementation. And I think you can go back to small refinery exemptions to some extent, and that being at least one of the places you can put your fingers on.

Sarah Mock: Seth's point here about RVOs as a self-fulfilling prophecy gets back to Brent's previous point about the cost of compliance. If the EPA is setting annual volume obligations, not based on the ambitions of the original legislation, but based on what could be easily achieved, or in other words, based on a figure that would minimize or at least hold down, the cost of compliance, then that fundamentally undermines one of the key goals of the RFS itself, which was to use a meaningful cost of compliance to incentivize investment in the ethanol sector.

So why has the EPA been giving out these waivers? Because after all this time, and through the course of multiple administrations with varying loyalties, David says regulators as still trying to find the fairest outcome. As demand for oil has declined and the economics of ethanol have shifted, waivers were a way to even out those pie pieces a little bit, to redraw the lines and strive for a kind of balance.

But the problem is, and one reason why the issuing of these waivers has led to lawsuits, is the question of what Congress intended the RFS to be about, is no longer an open one.

Here's Scott Irwin:

Scott Irwin: It's now been confirmed in three different federal appeals court cases. This is now a part of case law in the United States. That congressional purpose for the RFS was for an increasing amount of biofuels to be used in our surface transportation fleet in the United States and it was to be quote "a technology forcing through market pressure policy."

So, any policy that basically pulls back and - I don't care how you formulate it under rules, different metrics – however you do it. If the gallons of ethanol and biodiesel advanced by other advanced fuels goes backwards. Boom. You sue them based on that north star principle. And that's going to, I think mean we're going to be ending up in court probably forever because the refining industry is never going to give up and the ag industries are never going to give up either.

Sarah Mock: This kind of ruling is becoming more and more critical as blenders and refiners become more emboldened to challenge the RFS outright with an aim, it seems to eliminate the policy and roll back ethanol use. Though Scott Irwin says it's not necessarily having the impact that the ethanol industry has claimed they do.

Scott Irwin: I've been in a longstanding debate now with the U.S. ethanol industry. It's put me at various times on their naughty list. My analysis has led me to conclude, for example, that the small refinery exemptions that are so controversial have had little impact on overall aggregate ethanol use. And the reason I say that is because ethanol has become price competitive in the E10 gasoline blend, because it has high octane and it's priced competitively. My argument is, "If you took away the RFS tomorrow, I don't believe we'd use one gallon less of ethanol in E10." It will be the same because ethanol has grown up to be competitive in that market.

I mean that the refiners could be somewhat spiteful. I don't know what their policies would end up being, but the economics say, "Continue using 10% ethanol in every gallon of E10 gasoline in the United States."

And I would also have to say, I'm going to take ethanol advocates in D.C. and elsewhere, you know, the lobbyists and industry leaders at their word. They appear to really believe that small refinery exemptions destroyed demand for their product, I don't think the evidence is at all consistent with that, but maybe that belief, is also driving some of the political heat.

Sarah Mock: Scott's comments here is worth dwelling on for a moment, at the very least because it offers a valuable counterpoint to the idea that ethanol is a whole artificial market, or that it only exists due to the RFS. Because it seems like Scott is probably right here. Remember what we learned from Dr. Hanna Breetz all those episodes ago. Refiners needs an anti-knock agent, an octane booster, and today, after more than decade of support, ethanol is the most economical octane booster in the market. In that way, I think it can be said that the RFS achieved that part of its goal.

Still, there is disagreement about whether issuing an increasing number of small refinery waivers has decreased the actual use of ethanol today. But there is more general agreement among our experts that lack of consistency year to year around the waivers, and other policy implementation factors, create uncertainty that, whatever the intentions, is likely to have long-term, negative consequences for the sector. Here's Jarret Whistance again:

Jarret Whistance: You've got some of this flexibility that, there's a place for it, to be able to have, let EPA have this flexibility in how to implement the standards. Again, thinking about, the cellulosic waiver and something like that, right. Okay. We don't know if this technology is really going to take off. So, we're going to build in a little bit of flexibility and, if there's some sort of fuel disruption or, some sort of demand disruption, there's still this flexibility. And in some ways, there's this uncertainty and how these policies are going to be implemented and we're still seeing that even today. We're still waiting on the proposed rule for 2021 obligations, and I think in some respect, I think that kind of drives some of this volatility. It's hard for the obligated parties or the people in this market day to day to know what's really expected of them. The policy itself or the legislation is a rough guide, but until they get those definite rules it just sort of creates this sort of uncertainty and, I think makes it a little bit trickier for planning and for being able to maybe keep those prices a or a little less volatile.

Sarah Mock: Jeremy Martin at the Union for Concerned Scientists argues that this flexibility is not accidental, but the result of difficult tradeoffs. It's incredibly hard for lawmakers to balance the tradeoffs between flexibility and rigidity in a way that proves really optimal even as situations change.

Jeremy Martin: What I hear talking to stakeholders is that sometimes that flexibility, has been used in, to undermine the goals of the policy. So, that's a real tension, right? Like, do you make a really flexible policy, but then you got a hostile administration, and they can use that flexibility to undermine everything, or do you want to lock everything down? But then if it turned out your prediction of the future was imperfect. Now you're trapped in the inflexible system. And there's not a great answer to that question. It's just tradeoffs that have to be made.

Sarah Mock: All of these uncertainty around the RFS will likely continue to weigh on the minds of corn farmers because, at the end of the day, the corn, most likely, is still going to be produced. That's why the market for corn-based fuels is likely not going anywhere - not because of the strength of the fuels market necessarily, but more because the oversupply of corn came before ethanol, not the other way around. And given that we're unlikely to produce less corn any time soon, cheap, plentiful commodities will continue to make ethanol a viable use of the crop. And so, corn growers and their advocates will continue to fight tooth and nail against anything that threatens to erode the existing biofuel market.

I spoke with Kerry Rose, the Missouri farmer-investor, about how this situation looks from his perspective, and he really pulled these ideas together in my mind, explaining why, despite all the uncertainties and contention, farmers are hooked on supplying the ethanol market.

Kerry Rose: There's a lot of uses people are looking at different industrial uses for corn and soybeans. But none of them even come close, to being a game changer like ethanol did. We're using a third of the crop for one thing. Everybody's like looking out for the next Walmart or the next Amazon but I don't, there's not in the farm market. That's one thing was farmers, we're still, my whole life that's been talking about, value added and niche markets and stuff, but at the end of the day, most of us don't want to do that. We like farming, whether it's a big ethanol plant or a little, something else you're selling at the farmer's market, or anything that's a whole different business really, than the farming of it. And most of us, we like the farm. We don't really want to get too involved in the selling of it and we complain about, we're a price taker cause we're just growing a commodity, which is true. The elevator, I don't have to get along with them at all. They're going to pay me the same price as they pay everybody else. But that's what we want to do. We want to grow a commodity, as evidenced by what we do.

Sarah Mock: When I talked to Kerry about his thoughts on the RFS as a policy, he thought it was a good idea at the time, but things changed quickly, too quickly for those who were trying to make investments in the space. He's become less interested in these kinds of long tail projects ever since. As we transition our discussion over to ag carbon markets, what should we be taking away from what's happening today in the ethanol sector?

Mainly, I think, the lesson is that some kinds of policy flexibility, like loopholes, tend to be sort of like Pandora's box. Once a loophole is found - like RFS waivers - it becomes progressively easier to get through the loophole, until eventually, a policy risks becoming completely impotent.

What does that mean for today's ag carbon markets?
That's after the break.

[[COMMERCIAL]]

Sarah Mock: I want to start our ag carbon market discussion today, by thinking about the possible impacts of carbon markets on land use changes, an effect that could translate very similarly in these new markets as it did with ethanol.

Aaron Scott: We've baked in this sort of fixed demand for corn that comes from ethanol. And so, that obviously helps corn prices and helps the value of agricultural land in particular and I think you're - the big risk with these sorts of push for more carbon farming is that basically we ended up sort of doing the same thing again with not sort of a huge impact on carbon emissions. And so, I think, it's probably just best viewed, as a transfer to the owners of agricultural land essentially because you're making agricultural land more valuable but not probably having a huge effect on carbon emissions.

Sarah Mock: Aaron's concerns here are legitimate because he's basically just outlining what the effect will be of setting up an ag carbon market that, for whatever reason, doesn't actually require rigorous proof of carbon sequestration which, as we've discussed, is not a hard to imagine scenario.

But there's another, much bigger risk out there, that relates directly to another lesson learned from the ethanol experience. If these ag carbon markets fail to deliver on their environmental benefits, while still driving income, raising farmland values, and causing land use incentives to shift, the sector is likely opening itself up to many of the exact same kind of criticism that ethanol was susceptible to.
Here's David:

David Widmar: Now we have a carbon market out there that's incentivizing us to change the way we produce food. And I think that starts to become way more complicated. One of the things that happened with ethanol is if you take one bushel of corn and you turn into ethanol, it's not going to impact the market much at all. On the margin, every bushel, according to turn an ethanol, isn't going to be a problem. But all of a sudden, when you convert a huge share of the corn crop to ethanol, then these debates start happening.
So, what happens now, if the carbon market in their bidding against corn for acres, you know, what if we're sort of permanently putting acres into, to grass? If I can get X dollars an acre to do no-till or cover crops, how much can I get to put the whole farm into grass on a more permanent basis?

I think that's the next question. Is it going to be competing for the resources that we traditionally use for, you know, grain or livestock production? That's a question that I don't know at this point, and I think that's when the carbon market's going to start to maybe go under some of this more questions of, you know, are we going to use this for food versus carbon offset debate? Or whatever that, that next sort of debate is.

Sarah Mock: Brent shares David's concerns about the potential for ag carbon credits to increase land use competition in unexpected ways. Especially because of the sheer scale of a possible future carbon market, which would like dwarf, say, the liquid fuels market.

Brent Gloy: So, the potential for unintended consequences in these smaller markets is massive. So, in other words, if carbon prices get really high, people are going to do all kinds of things that, society might step back and go "I'm not sure, we want to be planting all this land in Illinois to forests," but if the carbon prices are high enough, they may just do that.

And the interesting thing is, well, oh, well, we could just make it all, grasslands, and the marginal lands, like where I live. Well, yeah. But our grasslands, aren't going to store nearly as much carbon as those productive lands in Iowa and Illinois. Putting cover crops on out here, doesn't do much. It does a lot more in those places because they produce a lot more biomass and

it's as a less area to area. So, at the end of the day if the prices are high enough, people will respond.

There'll be a big incentive to do that, and they can't plant enough for us, even in Illinois to influence the price of carbon. Because that market is so potentially big. If, but there's a big if here, and the big if is whether the carbon policy is binding enough to actually cause a change in behavior, because if it is, and it actually changes, people's behavior of how they use things that emit carbon, then I think the price for carbon can go really high.

I'm skeptical that that will happen in part because I don't think people want to change their behavior, very much at all. And I think there'll be enough industry-led initiatives that will make people feel good about what they're doing with respect to carbon, but won't do enough to actually change behavior, frankly.

So, in other words, the price of carbon will stay fairly low.

Sarah Mock: And it's pivotal to remember that if the price of carbon does rise precipitously and farmers see real returns to their participation, we know where that cash will end up.

Brent Gloy: That's where a lot of the rents go, is to farm on some of them spill into other areas as well, but a big chunk of them end up in the land. And that's what we would expect would happen. And it's not to say that I think carbon could be a significant impact on agriculture Like I said, if you think about it, the potential for it to impact the ag sector is very large. If the prices were high, it would have a big, big impact in the ag sector.

So, if you kind of probabilistically weight it - the upside is very big, even if it may be a small probability of it happens. The downside seems really small at this point. So, it's probably got a net positive impact on average. So, I would expect it would have some impact on agriculture going forward.

David Widmar: I think, if you think that there is a large upside potential here for agriculture, I think you have to step back and wonder what happens when the customers, who are buying these carbon credits or these offsets that you're producing, decide the cost is too much. And so just as corn, a lot of corn producers are in angst about what happens if policymakers significantly change RFS to that weakens the RFS policy that we use less ethanol, how devastating that might be to corn markets.

You can think about what happens whenever, users of carbon, all of a sudden wake up one day, say, "Hey, this isn't as, maybe as big of a challenge as we had before, or it's getting to be too expensive." There's no mandate, there's no law saying they have to use these at this point, so they could be sort of fickle, customers.

And so, I think that's sort of a tradeoff. You have got to think about what happens if those were to disappear or that market was to evaporate or dry up a little bit. I think one of the similarities here is that it could be a new demand for agriculture. So, that has some enthusiasm, but I still believe in the long run, ag will find a way to create and supply and so, how long will that last?

And you could see a scenario where a huge financial recession crossed the globe. This carbon market could dry up very quickly. So not only are we linking it to maybe a bigger market, right? That sort of market that's driven by factors, way bigger than agriculture. We also maybe are linking it to some of the cyclical patterns that it might face. I don't know how that will work. Maybe there's long-term contracting and all this stuff, but we just have to recognize that, that's a new venture and a new demand, and it has all new implications as we think about how the carbon markets are going to get priced.

Brent Gloy: I mean, if carbon compliance ever became a reasonable sized line item on a financial report for public company, I think people would have a different discussion about it.

Sarah Mock: I asked Connie Bowen, the ag tech investor about how she thinks about this high-level uncertainty in the demand for ag carbon credits, the bigger concerns, from Connie's perspective, are not around inconsistent demand and how that might affect ag carbon markets. She's more worried about the supply, and how and why farmers and other landowners are getting on board, and more importantly, who benefits.

Connie Bowen: I think, and this is based on personal experience, like my family has a farm, right, in Iowa. My grandma doesn't actively manage it. We finally got cover crops after like years of my dad and I bugging, the guy who manages that land. But the thing that actually has made my grandma change and excited is payments for carbon. Oh, okay, carbon markets - I understand how the marketplace works. I understand how to market a commodity, like carbon, what do I need to do to get it?

And I also have spent some time on the farmland investment side. And again, from that seat, it's a lot easier when you're just thinking purely about the finances and not so deep in the operation of it. To think about, okay. I should be thinking about the long term. I should be thinking about where these kinds of future market opportunities are. So, I think that the answer is actually probably more in landowners than in farmers, which is not necessarily for the best, but I do think it's the reality.

Sarah Mock: Though Connie has some serious doubts about the near- and mid-term outlook for ag carbon prices, she does think there's other, innovative ways for farmers to drive revenue from using more sustainable ag practices, beyond selling credits.

Connie Bowen: It still makes sense for you as a farmer, if you're able to tie the practice change that leads to a carbon credit or carbon sequestration to your end product and drive a premium for that end product, then who cares what the price of carbon is, it's icing on the cake.

But I do think that everyone needs to be modeling for that case, and not that there's proof that you're going to be able to get that premium either. But that's a little more real, actually a little bit more able to be determined.

Sarah Mock: Connie too has spied the incentives that ag carbon markets might create to make significant land use changes, and she see this as a major opportunity, rather than a weakness, of the markets themselves.

Connie Bowen: There has to be a simultaneous conversation about diversification. So, the land that corn and beans are on definitely has to be involved. I don't really care about the corn and beans. I care about being able to derive a premium off of a crop or a thing I'll just say, produced on that land. That is real, shorter term so that you can justify the investment. And that's where, this is why I brought acreage up. I do believe this can displace some portion of corn and soy. I still think that, because it doesn't require - like the other side of this is the labor side, which again, can't get into, but like that is the that's the most major limiting factor in actually, changing from a row crop system.
But I think that there is an opportunity to say, "We can show that, okay. We used to plant this acre in soy. Now we're planting it in hemp. We can show you the delta in carbon dioxide there." And the hemp buyer for installation made from hemp fiber does care about that because that's actually part of their story that folds then – ready, stay with me, that then folds into their LEED or Living Green assessment for the building, right. Which account for inputs into the building and the footprint of set inputs. And if also construction is going to be pushing to be greener, right. Because all these other things have to be happening around for the work at all. So, there is an opportunity for a premium there that I don't see there being an opportunity for a premium in ethanol specifically, but maybe I'm wrong about that. Like maybe there is an opportunity for the green gas station to emerge.

Sarah Mock: Connie, like Brent, sees a lot of upside potential in ag carbon markets for individual farmers and for the environment, particularly when they capitalize on these so-called charismatic carbon credit buyers, or companies that can use carbon purchases to add value and increase the price of their products. But she also sees risks, particularly when it comes to farm data ownership. She sees those risks as two-fold, first, that farmers may be sharing data with companies to be part of these markets that can, in future, be used in potentially nefarious ways. But perhaps the bigger risk, from Connie's perspective, is that farmers may not be keeping rigorous enough data records to be able to benefit from it later.

Connie Bowen: I do think though, that you can get the price premium for tying sustainability attributes to your product. And I do think it's worth tracking that information today in a third-party data kind of provider-owner, I would recommend that farmers do that actually - read your data usage agreements, and privacy policy agreements. Store your information in a way that is verified. If you even think about like auditing your finances, that's how you should be thinking about the, like, what did you plant? did you till? What did you spray? If you're doing soil testing,

make sure that's like get it signed, honestly, like this sort of thing I think could be really valuable in the future. And I would hold on to it if I owned a lot of land.

Sarah Mock: And I think there's one other important part of the ag carbon market and land value conversation that is also missed when we discuss ag carbon markets, and that is the fact that, building up organic matter in soil, or carbon, in other words, can help reduce fertilizer needs on farm, can allow for better water-holding, Living roots year round help keep soil from eroding, keeping valuable material in place during off months, and in-field biodiversity can help to reduce pest pressure and crop protection needs. In other words, so-called carbon sequestering practices, when they're executed effectively in a way that actually offers soil regeneration, can reduce a farm's cost of production over time, in effect, increasing the land's productive capacity, and thus it's value. Notably, this happens independently of the sale of an ag carbon credit attached to these activities and is like a competitive advantage that not all farmers have equal access to.

So where does that leave us? Revisiting the lessons from today's ethanol market, I think most of these similar risks for the ag carbon market, are still a long way off, but they're worth thinking about now, because policy is a slow-moving animal, and markets have long tails. To avoid long-term problems often requires acting now.

So, first, if a carbon policy is actually going to motivate the environmental change we want to see, we should expect it to become costly, and thus unpopular. When we think about policy, then, we should work to balance flexibility and strength, focusing on those simple instructions for complex actions that Aldyen Donnelly talked about all those episodes ago, and finally, we need to think very critically about the incentive structure we plan to create around land use related to ag carbon markets.

Imagine a couple of scenarios. What about one where a market or policy is relatively flexible or porous, where the bar for creating a carbon credit is low? Companies may be interested in buying cheap carbon credits in the near term, but a few dollars per acre won't be interesting to farmers for very long, especially if data-tracking and reporting requirements are rigorous. Or, as enough farmers become interested even in a relatively small dollar return, creating cheap carbon credits will simply become the norm, more requirement than option to keep up in a narrow margin game. Plus, in this scenario, if the price tag for ag carbon credit ever does rise, companies will simply stop buying them.

Alternatively, consider a market or policy that's very strict and rigorous. As companies comply - assuming compliance is mandatory - the price of carbon credit rises and farmers become more and more motivated to focus on creating carbon credits and ignoring other, less lucrative markets, like, say, overproduced corn. This could be a scenario that motivates the planting of forests and grasslands across the Midwest, which could, simultaneously, help support other commodity prices, by reducing the oversupply problem. That could be a kind of win-win, for a while, at least, a bad weather year comes, and stocks hit lows while prices skyrocket, and people rush to till up their grasslands, to take advantage of corn prices. This would throw the carbon

market, which had banked on that grassland carbon staying in the ground for decades or centuries, into chaos.

No matter which scenario we consider, one of these or countless points between them, one result is clear. We can safely expect that the value that ag carbon credits adds to farm balance sheets will quickly become capitalized in the value of farmland. And as the many, many possible scenarios we've discussed over the last 8 episodes have shown, it's likely that the increased farmland value could occur, while achieving very little carbon sequestration at all. I'm going to leave the ag carbon conversation here for now, and we'll come back to it in our final breakdown. The time has come to peer into the future of corn ethanol and find out where this podcast comes full circle. Selling ag carbon neutralized ethanol.

Next time on Corn Saves America.

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 Hubbart.

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