FCC Knowledge Podcast

Season 5 – Episode 1

Making the case for ag tech

PODCAST TRANSCRIPT

Interviewer: Aimée Stang (AS)

Guests: Jeremy Wind (JW), Joshua Day Chief (JDC), Darren Anderson (DA)

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AS: Welcome to a new season of the FCC Knowledge Podcast, a show that features real Canadians in agriculture, real stories, and real conversations about the business of farming. This show is brought to you by the Manage Your Farm Finances course series. I'm your host, Aimée Stang.

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JW: It's talking to other producers, educating yourself, trying these products yourself, but doing a good job of doing those trials, not just throwing something on and then going in December "Oh yeah, how did that turn out"? You have to focus on seeing the results for yourself.

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AS: Advancements in technology have always propelled the agriculture industry forward and have allowed farm businesses to become more efficient and productive with each generation. Today's farm CEO understands that their businesses need to be adaptable to change and prepared to integrate new tools and innovations that drive competitiveness in the marketplace as well as sustain long-term growth.

That's why it's not surprising that AgTech is getting more attention these days from a management perspective but also from a capital investment perspective.

Today we're chatting with three experts in AgTech, specifically in the biological space, to get a behind-the-scenes glimpse of new technological

developments. We'll also hear how one farmer is approaching the evaluation, testing, and implementation of biological technology on his operation.

Jeremy Wind owns and operates Windiana Farms alongside his family in Purple Springs, Alberta. Their farm is mainly focused on potato production for both the chip and fry markets. However, their rotation crops include a variety of grain, oilseed, and pulse crops, as well as timothy hay.

Joshua Day Chief is the Chief Executive Officer of Advanced Ag, a biological technology company based out of Raymond, Alberta, with over 20 years of research and experience in the biological space.

Dr. Darren Anderson is the founder and CEO of Vive Crop Protection, a data driven biological crop protection company based out of Mississauga, Ontario.

We're so happy they joined us today.

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AS: Welcome to the podcast, gentlemen.

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DA: Thank you

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JW: Thank you.

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JDC: Thanks for having us.

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AS: So let's dig right in. It's always interesting to hear the origin story. How did you wind up in the ag tech space? And how about we start with Josh?

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JDC: I've actually never farmed a day in my life. My mother started a company 25 years ago and since 2001, we've been working with bacteria with what started with water and wastewater treatment. And then about 10 years ago, we got into agriculture and it's been a steep learning curve, but we've had the privilege of working with a variety of growers across Canada. Just within that

decade, there's been so much that has happened, not just within the ag space, but within the whole biological world.

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AS: How about you, Jeremy?

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JW: I've been in ag all my life. My parents started our existing farm when I was about 8 years old. I've been helping on the farm ever since then. I started full-time just after college when I was in my early 20s and have been doing this ever since. My wife and I run the operation now and I couldn't imagine doing anything else.

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AS: And Darren, how about you?

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DA: I think I get to combine some elements from Josh and Jeremy. Like Josh, I did not grow up on a farm. I grew up around farming, had family members that farmed, but when I was in high school, I ended up moving to the Toronto area and have very much been a city boy since then.

But when I was doing my PhD at the University of Toronto and we developed the technology that we use here at Vive today, we actually originally developed the technology for applications totally outside of agriculture, so in medical devices and televisions.

And about four years into the company's journey, we actually realized the best opportunity, both from a technology point of view, but also from an impact point of view was actually in agriculture and started moving the company in that direction. I've now been in agriculture for about 16 years. It's an incredibly exciting industry to be part of.

I'm incredibly passionate about technology as a force for good in agriculture, both around increasing productivity and the environmental impact of what we do in agriculture and have planned to spend my career here.

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AS: I'm curious to know a little bit more about your businesses. Jeremy, tell us a little bit about what you grow and what you do.

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JW: We're located near Taber, Alberta. We're a 2,500-acre irrigation farm. Our main crop is potatoes. We grow chip potatoes for the chipping industry. We also grow quite a bit of timothy hay. Most of that is destined for the export market into Asia. We also grow some cannery peas and some dry peas as well as some durum and other cereals.

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AS: So quite a mix.

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JW: You bet. We started in 1990 where my parents started it, and have grown to where we are now.

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AS: And Josh, your mother started this 25 years ago, you said?

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JDC: We're in southern Alberta as well, just south of Lethbridge, about 20 minutes, in a small town called Raymond. It's a great place to do business, especially in the ag community.

The company was started 25 years ago, and really it started out with an idea that my mom had on using different bacteria species to cycle nutrients in aquatic ecosystems, so lakes, ponds, and even wastewater environments. And honestly, the company was kept afloat from federal research grants through IRAP and partnership with the Lethbridge College on applied research.

And then around 2014 or 2015, the company shifted towards looking at how biological technologies could be applied to a variety of different cropping systems. And what started with high value crops in international spaces – pineapples, bananas, aloe vera – we then started doing trials here in Canada. It started with 50 acres of peas in Schuler, Alberta. And last year we hit over half a million acres treated across Canada and parts of the US. It's been exponential growth, a very exciting phase of the business. I feel like from a research and R&D perspective, we're just scratching the surface.

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AS: For our listeners' benefit, IRAP stands for the National Research Council of Canada Industrial Research Assistance Program.

And Darren, you're based out of Ontario, correct?

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DA: We're in the Mississauga area for our R&D facility. There are fantastic scientists available both in the Toronto area and Guelph as well. Our commercial organization is distributed across the country.

Our business is really about taking existing active ingredients, whether they're traditional chemistry growers have been using for a long time and trust or next generation biologicals. And we have a technology that helps those products be more effective that's built into the jug that a grower would buy, whether that's controlling how they behave when they're applied to the soil or the leaf or helping mix with fertility. So we've got a complete portfolio of products.

We've been primarily focused on the US despite being a Canadian company, primarily just due to the time it takes to get regulatory approval here in Canada. But we're really starting to explore the Canadian market. Our products will be used on about 3 million acres this year. In Canada, it'll be canola and wheat, although we do have a product that's also used on potatoes.

And then in the US, some other crops that are not as relevant here in Canada, sugar beets and cotton and peanuts and a few of those other crops that are much less common here.

Although there are some beet growers here in Canada, it's just not a particularly big crop here.

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AS: As luck would have it, you have two guys from an area where sugar beets are grown.

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DA: And hilariously, I grew up in Lambton County here in Ontario, which is the other center of where sugar beets are grown here in the country. So life has brought me full circle. And that was the first crop that we started selling into in the US, and it's actually the crop that we have the most products for.

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AS: Overall, I want to talk about ag tech. Because you're all specialists in the biological space, what does that term actually mean? Josh, do you want to start?

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JDC: It's discussions we have with our growers all the time. Biologicals are living organisms that can help improve the productivity of a variety of different crops. But it's also important to understand that we need to break them up into three different categories. We have biofertilizers, biostimulants, and biocontrol products. Our company specifically focuses on the microbial side, so biofertilizers and biocontrol. It's really important for growers to understand the differences between these products.

We get approached all the time and they'll say, “I've tried a biological”. Okay, what did you try?

“Well, I'm not sure exactly what was in it,” because even across the board, even just with stimulants, it's such a wide range of products. So it's really important to define the categories of biologicals, and we're really focused in the microbial space.

Biologicals are not new. The research has been going on for decades on single strain organisms. And then just understanding the species and the functionalities behind the bacteria is really, really important, especially when you're looking at achieving certain goals on the farm using these products.

That piece of education is really the first layer when you're talking to growers, understanding just the different categories and how these products are going to function.

We get it a lot of time where guys just want to try a biological, but you have to ask the question, “Why?” What's your purpose for using them? And then from there, you can start building. You're looking for a biofertilizer, which would make nutrients more available to the plant that are otherwise not available. Or you're looking for maybe something for disease resistance, and that's where you'd need a biocontrol. The term biologicals all get thrown into the same bucket, but it's important to understand the three different categories there. It's the biggest gap in ag right now in terms of biologicals, is that education piece.

And so that's what we do. We had a lunch and learn yesterday, and we're starting at square one. “Here are the differences and here's how you can use these products to increase profitability on the farm”. You have to start there. Here are the differences and here's what they can do for you. Not all products are the same. It's not a one-size-fits-all. So we try to understand the farm and implement our products to fill that gap.

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AS: Darren, do you have anything to add about how we define biologicals?

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DA: Biologicals can also include not just living organisms, but also extracts from living organisms. I mean, if you think about microbials like bacteria, what's happening there is they're being applied and then they're producing something that has an impact on the plant. Sometimes you'll actually make those bacteria in a manufacturing site, kill them, but then harvest that active material and then that's what would end up being applied. And that would still be a biological. And there's even some products that are considered synthetic chemistry today that are manufactured using that kind of process.

It is a very broad category and I think it's a lot more useful, although I take Jeremy's steer on this as he's the lived experience here, but I think it's a lot more useful to think about what you are trying to do and what you're trying to accomplish instead of thinking about them as a category.

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AS: That's a great point. Jeremy, what's your take on this as a grower?

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JW: From a grower's perspective, it's incredibly important for the average grower to educate themselves on this space. There's such a difference between live bacteria or the results of the bacteria life cycle. We've tried all kinds and depending on what you're trying to accomplish, what you want to do for that plant, you need to know the type of product that you're looking for. And that's why we have guys like this to educate growers on what they need to be looking for.

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AS: If research has been going on since the 1970s, would you argue that adoption has been slow, Josh, or is this just kind of how this type of technology advances?

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JDC: I look at it at two different phases almost. I think adoption was exciting at first, and I think it started to gain a lot of traction early on. But I think we quickly realized that commercialization isn't as easy as you'd think. Just because a research study showed something in a controlled environment like a greenhouse, how is that going to respond on the farm? And every farm is unique. I know when we got into the ag space, there was a lot of talk about bugs in a jug, a lot of claims. There have been some products that have come into the industry and have really failed, and that's what we were up against. And we were one of the first technologies commercially available. We had seen some companies and products come and go, and we did not want to be that. I think adoption was a little slower when we got going, but we just backed it up with trying to understand the farm and doing on-farm trials and not just on-farm, but the replicated stuff.

You need all three: the greenhouse stuff, university studies and the replicated work, but also that farm work is so important. How do these products fit into what the farmer's already doing?

Jeremy, you probably have a neighbor right next to you who's doing things completely different than you. What products are they using? How are they compatible with products like ours?

That slow adoption is needed and we're seeing some biological products and companies get into the space and huge marketing dollars and they're going through retailers and they're slinging the product out like crazy. I don't necessarily think that's sustainable. I think you get a bad reputation. Word spreads fast. I always say that you're one farmer away from knowing every farmer in Western Canada.

If you build a bad reputation, you might be around for three to five years, but that's not the vision for us. We're trying to do it from agronomic practices, data, and doing the research and the due diligence so that someone like Jeremy, who's been doing it for almost a decade now, it's a staple on their farm.

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AS: And have you been working with agronomists also?

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JDC: Yeah, if you look at their training and education, how much of that was around soil biology and learning about biologicals? I've been brought in to speak at different agronomy conferences. They realize their customers are asking more questions about this stuff and they want to educate themselves on it as well, especially as you see some of the larger companies get into this space.

Even five years ago, we were still the crazy guys out there. Imagine 25 years ago, right?

Just the price of commodities being squeezed from both ends for farmers has really paved the way for biologicals and a variety of other technologies to rise. You want to learn. You don't want to be the last guy to learn about this stuff because it's coming quickly.

And I've heard Jeremy make the comment that Josh lets me know every other week on some new thing they've discovered. And that's how it's going right now. We're learning a lot in a very short period of time, and it's going to continue to go this way.

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AS: And from your perspective, Darren?

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DA: We're also primarily focused on biocontrol, where we're working with biologicals. One of the reasons there's so much innovation happening today is because the last new mode of action on the herbicide side was 30 years ago. There's very little innovation happening in the pipeline of the big multinationals in terms of chemistry. There just aren't as many modes of action to find. There isn't as much research, and it costs so much money to develop a new molecule and takes so much time to get those products approved that that innovation well is really drying up. The most recent figures I've seen are it's over $300M in 13 years to bring a new chemistry to market. Now, if you compare that to a biological, those products tend to be able to get approval more quickly. The cost to develop those products is a lot lower. And so there's so much more innovation happening in that space. And that is where the new modes of action are going to be coming from.

But to Josh's point, it's almost like we're back in 1926 when there's all this chemistry to discover, but we have to figure out what's good. Same thing on the biological side. Today, there's so much innovation happening, but there's a lot more work going into how do you figure out which products are going to perform under which conditions.

We've actually taken a bit of a different approach where we really focus on the research as well, but we're often looking to pair a biological with a trusted chemical in order to help supplement the performance. Often a biological and a chemical will actually complement each other really, really well when they're used on farm because they might have the ability to manage resistance. You might be able to have one product that might be a little bit better from a residual point of view and another one that might be better from a knockdown point of view. There's a variety of reasons why you might want to use them together. That's part of our approach. The grower is buying the trusted tool that they've used for a long time, but they're getting the sustainability and performance benefits associated with the biological on top.

There are a variety of different ways of dealing with some of these adoption challenges, but there's so much to understand. It's really important that companies that are bringing these products to market understand how they work, prove them under local conditions, and make sure that they can stand behind them. That's really going to be important to bring sustainable solutions to growers.

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AS: Jeremy, what's the attitude towards biological?

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JW: Ten years ago, I was the crazy one, right? There were those early innovators that were seen as that. And in 10 years, we've gone from that to now farmers are starting to sit up and take notice of biologicals, but there is just such a large variety of products out there that they almost don't know where to go. There are so many to try, they're just bombarded with different types and different companies. That has led to some of the slow adoption too.

There are biological products out there that are not successful in the field, and that gives everybody a bad reputation.

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AS: So how do you know where to go then?

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JW: It's talking to other producers, educating yourself, trying these products yourself, but doing a good job of doing those trials, not just throwing something on and then going in December, “Oh yeah, how did that turn out”? You have to focus on seeing the results for yourself.

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AS: So is this just another thing for farmers to learn?

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JW: It's a progression. With conventional farming practices, you have to adopt new things or some of the damage to the soil is irreparable. We always have to be moving forward and considering that we want this land to be farmed 2, 3, 4 generations from now.

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AS: And how do you see this, Darren?

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DA: From my seat, I made this comment earlier. I view, at least on the biocontrol side, I view the biologicals in a lot of cases as just that evolution of chemistry. One way of thinking about it is it's this whole new set of things that you have to learn. Another way of thinking about it is as the next category of crop protection products.

They're biological, they're a plant extract or a microbe or a fungal spore or whatever, but the reality is they're a crop protection product and our growers know how to assess a new crop protection product when they're looking something on their farm. And you can assess it the same way you assess others and think about whether or not it fits on your farm.

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AS: Do you agree with that, Josh?

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JDC: Yes. We also work with biocontrol product and continue to do a lot of research there. That's a little bit more cut and dry. Obviously, there are things, from a management perspective, that you can't mix with certain things. They're UV sensitive, they're living organisms, so you just have to wrap your head around that. But for the most part, the biocontrol, it's a different tool, but it's still the same tool you were trying to work with before, just much more sustainable and natural.

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JW: Yeah, Josh, you make a good point on the application part of it. A lot of growers are hesitant because you're working with a live bacteria, and you may be brewing or you can't tank mix with certain things. And to the average grower, often that makes them hesitate to use them. But once you adopt it into your own program, it just becomes normal.

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AS: Would one season be a reasonable amount to trial something or would you recommend a multi-year trial? What's your formula for that?

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JW: Well, it took us four years. We started small and gradually got bigger. We were trying on different crops, different rates, different timings, all those things. It took us about four years to convince ourselves this is the way we're going to go forward from now on across all our acres.

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AS: When is the right time, from a farmer's perspective, to consider new ag tech?

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JW: I think it's a mindset. If you feel that you're not growing, you're not progressing, you're not improving, whether that be margins or quality, that you need to look to new technology to improve your operation. If you're standing still, you're dying.

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AS: Darren, what about you?

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DA: It's a lot more practical to be thinking about solving a specific problem, and it can be overwhelming. If you're just thinking, I want to do more that's biological, or you're talking about trying to replace some of your nitrogen, or you're talking about biocontrol products, or you're talking about trying to get more yield with a biostimulant. Are you doing it on all the crops you grow, a single crop? Start small. Start with a desire to deal with a specific challenge and then look for products that fit that need.

I was talking earlier about our hybrids where you have a combination of a synthetic with a biological. Often, growers say, right now I'm buying three-way fungicide from one of the big multinationals and it's very, very expensive because it's got the newest and greatest new synthetic active ingredient. We might be able to offer them an opportunity to do that much more cost effectively by combining some of the synthetics that might be in that product with a next generation biological.

But that would be an example where they're looking to save money on the premium product that they're buying from the multinational and still get good disease control and then they can look at what products might fit for that. That's really the easiest way to get started and then build from there.

Maybe the first year you run one or two experiments on a couple of different challenges you've got, and by year three or four... I'm kind of curious how many products Jeremy's testing in any given year, but I bet it's a pretty significant number.

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JW: That number changes every year, but we spend a lot of time during the winter researching products and come up with a plan before we ever go out into the field. We've tried a lot of things over the years and you just got to whittle it down to what works on your operation.

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AS: I really like what you said, Darren, about looking for a tool to solve a problem.

It reminded me of a quote I heard once about if you're trying to adopt a technology, it's like buying a hammer and then looking around your house for something to hammer. I'm assuming that that's kind of how you are looking at the technology.

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JDC: I can't really talk from a farm perspective on technology altogether, but on the biological side, having these early innovators was so important for us to understand how these products were going to respond on the farm. As time has gone on, and even in the last two years, I feel like we've learned more about our biological technology than we have in the first 23 years.

We're becoming a lot more predictive on how these products are going to respond across a variety of different cropping systems. Whereas before, when we first started working with guys like Jeremy and other growers, when we first started getting into this, we had more questions than they did. I think part of that transparency and openness of, “We don't know, but we think this is how it's going to respond”.

They had a whole mindset of being open-minded and asking the questions. We were transparent. We didn't know what we didn't know, but over the last decade, we've learned so much.

I think over the next decade, we're just going to get to a point where these products are predictive and we'll know based off of this soil type or compatibility with this product how it's going to respond.

Over time, you learn and learn, and I think that adoption of biological products is going to become a little bit more seamless compared to the early innovators.

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DA: Well, Josh, we guess part of it is the scale that you're starting to get to as well, right? Like you mentioned earlier, when you're on half a million acres, that's half a million acres of real world experience on how do these products work, under what conditions, which crops, and the amount you can learn when you're on 500,000 acres compared to when you're first getting started and you're on 10,000 acres is just so much more.

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JDC: And one of the things we do too is build a research pipeline, and we don't just say “Okay, we think we need to study this”. We listen to our growers. I think that's one of the benefits of being a small company is [that] we talk to Jeremy. We had three growers in our office yesterday talking about what they're doing. And a lot of our R&D is based off what problems they're trying to solve and what questions they have. I would say in the early years, we didn't know,

so we were building our research pipeline based off our assumptions of the industry and what guys wanted. But we really listened to our growers. “What are the pain points? What are you trying to solve? What did you notice with the products?” And building it out from there.

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AS: Darren, do you engage with your growers in a similar way?

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DA: Exactly the same experience as Josh and exactly the same reasons. I think it's a unique element of being at a smaller company. We can be a lot more nimble. And honestly, it matters more to us.

There's a population of growers that maybe they've only got 25,000 acres total that have a specific issue. I mean, that's still meaningful for us and still something where we can afford to make the investment and design a product that's going to be able to help in that opportunity, that kind of size.

But the way that they're set up, they got to build something that will go coast to coast to coast. We can be a lot more agile and nimble and listen to the growers and develop products faster and develop them for more specific needs. It is a superpower of smaller companies.

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AS: So Jeremy, you mentioned that you plan out your research, or what you're going to research on your farm, in January. What happens in July when whatever you were planning, the weather is not doing what it was meant to do?

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JW: You just have to take that into consideration. We had one trial with Josh about four or five years ago on some alkaline areas that the crop got hailed, so we

didn't get any yield data out of that. At the same time, we still saw the improvement in plant production, and you still take something away from it.

But yes, your trial has to be flexible to some degree, and it takes a lot of really paying attention. You can't let the busyness of the summer just allow you to forget what you're doing because then you lose a whole year of what you're trying to research.

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AS: Do you adjust your plans over the course of the growing season, or do you pretty much stick to your plan?

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JW: We may. You're always going to adjust to what's best for your crop. We're not a research farm where we go in saying, “This is the trial, and we have to stay exactly on that.” No, we're going to be flexible all season, and do what's best for it.

And then you take everything you've learned through that, whether it be your original plan or a changed plan, and say, “Okay, this is what I learned over the course of the year.”

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AS: And Josh, that speaks to your point about having real farmer data on real commercial farms.

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JDC: Yeah, working with guys and paying attention. What are your goals with these particular products? Knowing the functionalities that are there, and sticking to them.

Because a lot of guys will run a trial and they're thinking it's like a chemistry-based product. You run the combine and that's it. And you're just looking at yield. Well, have you reduced anything? That was something we missed early on. We were just adding on another product. At the end of the day, that's not a great sales tactic. Maybe we've already hit that yield potential for that crop.

So when we're running trials, we want to not just look at “Are we yielding more?” It has to be “Are we making more?” And that's how the discussion needs to be framed.

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AS: So calculating the ROI of biologicals or new ag tech in general. Darren, how would you recommend that be looked at?

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DA: Either you're looking at saving money on another input –

I was talking about our hybrids earlier compared to a multi-mode of action, newest and greatest chemistry that's out there. There are opportunities to save money with some of these products. You might be looking at a product that allows you to increase nitrogen production in the soil and therefore reduce your total purchase of nitrogen. That type of thing. Or it's about a situation where you're getting more yield or you're getting something else that your buyer is going to pay for.

I talked earlier about our US business. One of our biological products has been very successful in sugar beets. I'll bring those up again. In that case, not only do they help yield more, but they also increase sugar content, which is obviously something the co-ops pay for when they're doing their sugar payments at the end of the year.

It's all about either increasing productivity and increasing profitability, or you're replacing another input that saves the grower money.

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AS: Jeremy, how about you in terms of the ROI? What are you looking for when you're implementing these new technologies on your farm?

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JW: When we started, we were looking to increase yield and increase quality. So many more things have come out of it. We've found the yield potential for some crops, we have maxed it out. But the other thing is you got to consider - what about those spots that were less productive, that now with some of these products are as productive as the rest of the field. With land values increasing, it's important for us to make sure every acre is productive.

We've reduced inputs, which, with the price of inputs continuing to climb, that's become so important. We've been able to reduce our conventional fertilizer inputs between 20 and 30%, and that's been huge. When you look at urea at $1,000 a ton, it doesn't take too long to figure it out.

Some of the other benefits we've seen is storability on our potatoes. A potato crop is often stored for up to 10, 11 months. And if you have a crop that fails and isn't able to be stored that long, that's a big expense. If you have inputs that you can use to help that storability, that's huge for us as well.

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AS: And you're measuring all of these things, Jeremy?

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JW: In trials, yes, but there's also just the whole outlook of the farm. We focus on our farm enough; you can see the improvements in the end, the bottom line. We're consistently creating the same amount of yields with less inputs.

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AS: I know from personal experience that farmers like to keep our cards close to our chest in terms of sharing information with our neighbors. Is that changing? Does that need to change?

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JW: It really depends on the area you're in. In southern Alberta here, in this irrigation area, and especially in the potato industry, we do tend to share information between growers a lot. We don't really see fellow growers as competitors, but as peers.

And that's a lot of where our research comes from is other producers. That way not every farm has to do every bit of research for themselves. You can talk to your neighbors and find out what's working for them. Could it work on my operation?

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AS: That would probably help cut through a lot of the clutter of what you're seeing.

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JW: Yes, absolutely.

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AS: And Josh?

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JDC: I've seen both sides of the coin. Honestly, we've worked with guys here in Canada that you might be working with two individuals and their neighbors. And they grew up together. And they don't talk to each other about what they're doing with the biologicals.

But I've also seen in parts of Montana, for example. I went to a grower meeting, and there were 70 people in this room. And a farmer went up there and shared his books on a slide.

“Here's how much we're making. Here's how much we're losing. Here's what we tried”. And the transparency there, I couldn't believe it. That's a whole other level of sharing information. At the end of the day, the vibe in that roomand how open guys were to talking about all the things they're trying, you're going to learn a lot quicker that way as a collective. It was really cool to see that.

And things have totally shifted. The first meeting we had about what we're doing with research with biologicals, we had 11 people in the room. And I marketed the heck out of this, reached out to many people. Some of them were just there for the free lunch.

And now we're getting big groups of people that want to learn. And at the end of the day, even if we have growers who are skeptics on these types of technologies, they're all paying attention because the reality is these growers are saving money. And whether you believe in this kind of stuff or want to dive into the research, it's real. The case studies are real.

I had three growers on a panel yesterday and between all three of them, they were saving $350 an acre per year. And they've been doing this for five to 10 years. These are real stories. People are paying attention more and more as time goes on.

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AS: Darren, what has been your experience?

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DA: Given the amount of innovation that's happening in this space, that's driving some of the openness as well. When there's so much out there, you have to start to rely on people that have tried products or university researchers.

There's a bunch of different areas where you can learn about these products, but the reality is there's a lot out there. Ensuring that you're going to have a product that's actually going to work is so important. I think it's driving some of the openness.

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AS: One of the important factors any farming business needs to keep in mind is consumer expectations and demands. How does that play out in the context of what we've discussed today?

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JW: We talked about grower research, the fact that we're growing food. If you look at the average food consumer these days, they are asking how is their food being produced. Is it being produced sustainably and environmentally friendly? That's becoming a bigger piece that growers need to consider.

I know a lot of our customers that are multinational food corporations are demanding better of us, and we're doing things more sustainably.

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AFS: So these new ventures are giving you that opportunity to tell that story and to demonstrate those actions for your end consumer.

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JW: Absolutely.

00:34:07

JDC: Jeremy, how do you see them quantifying that or incentivizing growers as time goes on, as more of these technologies become available, more data becomes available on how we're moving the needle? And then just the incentives around that.

Like, if a potato grower is still profiting the way they are based off of how dad and grandpa did it, but maybe have a bigger carbon footprint, quality isn't there. How do you see that shifting over the next 10 years?

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JW: We're seeing that shift already, especially in the potato industry. The processors are requiring that. They look at all our inputs and what we're doing

on the farm. And there are different approaches. Some of them are strong-arming producers into, “You must do it this way”, and other ones are incentivizing us.

We have one of our customers that have actually created a scale that determines how much carbon you produce per weight of potatoes you produce. They rate all their growers on a scale of how environmentally friendly they are producing potatoes. And that looks at their inputs, their water usage, their fuel usage, all these things. They're asking us to produce results and improve.

00:35:18

DA: That's a super interesting illustration of the different parts of ag tech coming together because you've got the biological piece that's reducing your carbon footprint. You have the innovations on traceability and supply chain so that you can actually trace that impact and actually get a return for it for the processors that are buying the commodity. You have all of the tools on farm to measure fuel usage and efficiency of production and water use.

It's interesting where you see companies that are building businesses to support all those different elements of improving the sustainability of agriculture.

We've obviously focused today on biologicals, but one of the really interesting things to me is how those different types of businesses complement each other. You can end up in a situation where one plus one equals three instead of one plus one equals two.

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JDC: And we've done a lot of work there too. We're working with drone companies because they're able to apply our products. They're natural, they're not chemicals. All these pieces of the puzzle can come together to create a bigger picture and it's exciting.

Jeremy, you made a comment about different benchmarks that some of these processors are setting. Like, “Here's where we want to be in 2030, 2050.”

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JW: We've had our largest customer set those benchmarks. They said, “We want to be at this amount of carbon per hundredweight of potatoes by 2030 and by 2050”. We've actually surpassed their goal for 2050 last year already.

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AS: What are you going to do with the rest of your winter then? You hit the target.

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JW: We don't like to sit on our hands. We're always looking to improve more.

00:36:53

AS: We've talked about the past and present of biologicals in the ag tech space. Jeremy, what do you see for the future potential of both biologicals and the ag tech space in general?

00:37:03

JW: The next generation is actually interested in farming, which there was a generation there where that was a concern. There's just so much new technology, whether that be in biologicals or in equipment. There's so much technology in our space. I think it's just really exciting.

00:37:21

AS: Darren?

00:37:22

DA: This is an area where Canada should be leading globally. In almost every other industry, if we compare to our neighbors in the South, in almost every other industry, Canada is a 10th of the size of the US, and in a lot of cases, companies should start there.

But in agriculture, it's about a third. And it's an area where we have incredible science, incredible research, incredible farmers that produce under what can be very challenging conditions, incredible university resources and incredible innovation. And Canadian entrepreneurs almost always end up trying to build real companies based on real science that are going to drive real value to the growers.

Whereas I do think, let's just say in some other markets, sometimes it's a little bit more about marketing to the investor set than to growers and having

a real difference on the farm. This is an area where Canada can be leading globally.

There's such an incredible opportunity for the next generation of crop protection and crop nutrition and biostimulant innovations to be coming out of this country. It's incredibly exciting from that point of view, and I'm really excited to see where the industry is in 20 years.

00:38:27

AS: How about you, Josh?

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JDC: If you look at some market research, the biological industry is going to be worth $35B by the year 2030. But Canada is set to only have about $1B of that. I do think that number is going to change and I'm hoping it does with investments into not just the biological space, but the ag tech space.

We've gone down to trade shows and have done some work in the US and the amount of capital that's going into ag tech is really cool to see. But it also creates some confusion because there are so many biological companies that have raised capital and have heavy marketing. I'm really excited to see what's going to happen here in Canada with the investment that FCC and others are making into this space.

And I want to change that number. I don't want to be 1/35th of the biological market. I think we can do so much across a variety of different cropping systems here in Canada with biological technologies, and we want to be one of them.

I'm hoping that number changes, which, by the way, it has changed. 10 years ago, they said the biological market was going to be far less than that, and that number goes up and up and up every year.

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AS: Capital investment in this space is growing. What do you think is driving that?

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JDC: Like Jeremy said, if you're not innovating, or you're not trying new things, you're going to die. You can't just stay still.

And you look at some of the technologies that are coming out of Europe – we have some trials going on in Germany right now – they're just so forward thinking with not just biologicals, but a number of different ag technologies. And if we want Canada to have a seat at the table in terms of global agriculture, there needs to be an investment in ag tech. I have met some incredible founders with incredible technologies and ideas. They need support. And it's not just about the capital, but it's about strategic support as well.

When we look at bringing on investors, we want a group that's going to join the family and help us from a strategy standpoint. IP development, research, gives entrepreneurs a platform to grow their company. And it's really exciting to see a huge investment in that, and FCC is obviously leading the way there.

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DA: Food is incredibly important. Food security is national security. One of the reasons you're seeing so much more investment starting to come into Canada is because it plays to one of our national strengths. I mentioned earlier the relative importance of agriculture to Canada's economy compared to other countries.

But also, if you think about artificial intelligence or SAAS businesses or crypto or quantum or all the other kind of buzzwords right now, the reality is there is nothing inherent in Canada that gives us an advantage in any of those sectors. People flow across borders, capital flows across border[s], technology can flow across borders.

The land doesn't leave. The reality is that Canada has a built-in advantage in agriculture, and I think people are really starting to recognize that, and it's leading to more capital being deployed in this sector in Canada.

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AS: Are you seeing ag producers make capital investments in this space as well?

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DA: We've got one producer that's directly invested in Vive, and then one of our larger investors has 12 large Canadian producers that have invested in them and therefore indirectly invested in Vive. Certainly we're seeing more interest from producers in looking at this space, but there aren't as many easy

mechanisms for that to happen. I think that is an area where there's some room for some more innovation.

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JDC: And that's something we're really interested in. We've built relationships with certain individuals for almost a decade. Anytime you're looking at bringing on an investor, it's a marriage and there's strength in having farmers and your clients be at the table with you. And it is something we want to look at doing in our next round because they've been part of the journey the entire time and they've helped us develop products.

If I have a question about something research-related, I might pick up the phone and call Jeremy and say, “Hey, what do you think of this?” Capital is one thing, but who's sitting around the table and that strategy piece is equally, if not, more important.

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AS: Because this is such a big space, like you said, to have growers that would understand the business to cut through the chaff of what actually makes sense and what's just maybe marketing fluff. Traditionally, farmers have invested in their own business and their own future, but looking at adjacent businesses to them in terms of investment opportunity, do you think that's on the radar for anybody right now?

00:42:53

JW: Absolutely. Usually the investments will still be in the ag sector, but I think there's a lot of farming operations that are investing in other real estate involved in the commercial side of agriculture or in new innovations or trying to bring in retailers. It's important that you're still within the ag sector, but investing outside of your operation is incredibly important.

00:43:20

AS: This is not a new concept. It's just probably the technology piece of it is a little bit new and possibly scary for people. And maybe capital investment too is something it almost sounds “too highbrow” business for a farmer to get into.

But when you think about the dollars, the zeros behind the individual farms, you have to start looking at investment in a larger sense.

I really appreciate the time that you took to share your experiences with us. And I'm looking forward to see where you guys are going from here because there are great things ahead, I'm sure.

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DA: Thanks for having us.

JDC: Really appreciate it.

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JDC: Thank you very much.

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AFS: Developing and implementing the right technology strategy for the farm can be a daunting task, one that's very tempting to ignore. But as Jeremy mentioned, doing nothing can be detrimental to your business.

Often starting something new or different isn't easy, but our guests provided some great advice for taking some of the guesswork out of tech adoption.

First, you need to determine the problem you're trying to solve. Are you trying to increase nutrient uptake, manage disease or pests, increase productivity on marginal acres, reduce input costs, improve storability, reduce labor costs? Start there and you'll be able to narrow down the category of technology you want to explore.

Secondly, collaboration is key, whether it be with your suppliers, technical specialists, or peers. The more collaboration opportunities you can leverage, the more well-equipped you'll be to determine which options you want to explore within the technology category you've identified. Not to mention you'll have trusted collaborators to compare results and provide feedback to.

Darren and Josh were also very quick to point out that the success of their own technologies relied heavily on their collaborations with farmers and industry experts. But farmers have to commit to gathering good data and measuring the outcomes, both good and bad. Tracking a variety of variables, as Jeremy has done, allows you to be more confident in the results you're obtaining, and these results can take time.

It took Jeremy four growing seasons before coming to his first conclusions. He measured a variety of performance indicators including yield,

productivity, soil health, input reduction, and storability. He paid attention to what was happening throughout the growing season and course corrected when needed. And the next growing season, he applied what he learned in terms of how crop variety, performance, application rates and timing impacted what went into his storage facilities.

Implementing new technology on the farm is never a once and done thing. It's a continuous cycle.

It's exciting to see that farmers like Jeremy are embracing ag tech as adopters, product researchers, innovators and investors. And it's no wonder that ag tech entrepreneurs like Darren and Josh see the incredible opportunities for the Canadian ag tech space.

Thanks for joining us for this first episode of the season. Check the show notes for further reading and resources relating to this episode. Please do subscribe so you can be the first to know when we drop new episodes.

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