Connor Morrin:
Climate change is already reshaping global food production, and its impact will only intensify over the coming decades. Rising temperatures, shifting weather patterns, and extreme events like droughts, floods, and desertification are putting crops at risk while fueling the spread of pests and diseases. A 2019 study from the University of Minnesota found that essential crops like rice and wheat are already experiencing measurable declines. Maize production is projected to decrease significantly by 2050 due to temperature fluctuations and increasingly unreliable rainfall in key growing regions, including the United States and Brazil. Potato yields could fall by as much as 9% globally as water scarcity becomes a more pressing issue for farmers. To counteract these disruptions, digital agronomy is playing a crucial role in modern farming. By providing precise data on soil conditions, weather patterns, and crop health, digital agronomy enables farmers to optimise resource use, adapt planting schedules, and mitigate the effects of extreme weather events. This data-driven approach increases efficiency, enhances sustainability, and helps safeguard food production in an increasingly unpredictable climate.

Darryn Keiller:
I love technology and I was always fascinated by how technology can help solve really challenging problems in the world. So I always kind of had, I was always an outlier and I always had an interest in innovation. So that was how I kind of, what set me up for being an entrepreneur.

Connor Morrin:
That was the voice of Darryn Keiller Darryn is the founder and CEO of WayBeyond, a company championing modern crop management through accessible, actionable and scalable agronomy data.

Darryn Keiller:
So WayBeyond does digital agronomy. And so that's essentially how do we apply biological understanding of the crops that are being grown, marry that with data science, and then how do we apply artificial intelligence to get better answers? And that's essentially what WayBeyond does. So we optimise everything from seed to harvest and focus on horticultural production, so fresh fruit and vegetables. Irrigation is fundamental to farming. It's used in all forms of farming. So whether you're doing pastoral farming, raising animals, or growing large, broad acre crops like corn, soy, wheat, and so on. I think the challenge is the fact that as the population of the earth continues to grow, we have to produce more food to support that growing population. We're going to be drawing on more water. And in a sense, there's not going to be enough. In the same way that there's no more land, really, for farming, there's also a limited water supply. So I think how we manage our water, both for human consumption, animal consumption, and for crop production, is going

to be a really important thing in the world over the next 50 to 100 years. And so, you know, having a solution in that space is really important for our customers, the growers, you know, to manage that better. The irrigation module, it really came about for a number of reasons. I mean, at a macro global level, availability of fresh water for farming is like a big deal. You know, there's increasing levels of water scarcity. So for big farm operators, they want to produce their crops more sustainably. So they have to optimise the available water supply. And also that's one part of it. Another part is that Irrigation is a big lever in how you grow a really good quality crop. You've got to know when to irrigate. You don't want to over irrigate, you don't want to under irrigate. Also the irrigation system can carry nutrients in it. It can carry crop protection products in that water supply. So there's a lot, there's actually quite a lot to do with water that has to be managed. A lot of our commercial producers are based in equatorial regions like Mexico and Morocco. We have a customer in Mexico in Sinaloa actually, which is a state more well known for drug cartels than crop production. But one operator who's running about 200 hectares of production for tomatoes Their estimate is that for the coming season, they'll only have around 36% of the available water that they need, which means they can only plant 36% of their growing area. So that's sort of how visceral a problem it's becoming. So, you know, the whole subject of global warming, I don't get into the politics of that, just the practical reality of it. Water scarcity and warming are actually two separate topics, but they obviously are subjects that meet in the middle. And as it gets hotter, you have to irrigate more. So you've got this pressure of how do you strike the balance between optimising your water supply, you know, assuming, of course, that you've got a water supply in the first place, and managing the fact that you're dealing with, on average, higher temperatures or heat waves and that type of thing. You know, I think, you know, one of the bigger areas of technology in the last decade has been, you know, new sensor technologies. I mean, essentially, you can't do data-driven farming if you don't have the data. So, you know, the first thing is having to collect it. And there haven't been a lot of technologies available to do that until startups like ours sprung into being maybe a decade ago. So measuring not just the water usage, but also the pH level in the water, so how acid or alkaline is the water, what's called electrical conductivity. That's a measure around nutrient density in the water supply, which essentially is feeding your crop. Those are some of the measures. The absorption rate of water into the root system of the plant is another one. So all of these things can be measured now and they all provide really important inputs into data models. So the data models that we build take into account water utilisation, the microclimate around the plant, so temperature, humidity, radiation levels, all things that are impacting the physiological behaviour of the plant. And we obviously want to be able to provide growers with insight and prescription around how to better manage the crop during the crop cycle when it's being impacted by those things. So that's sort of where technology is now playing an increasingly large role. So you've got that sort of sensor level, which is, you'll hear people talk about IoT, internet of things, but that's almost become like,

it's just infrastructure on the farm now. The really clever stuff is being done with software in the cloud and like how you apply data models to that data, you know, different forms of AI, and then how you can provide value out of that data to help the grower optimise how their farm's being run. This whole transformation into using digital is a long process with the agricultural industry. I mean, it's an industry that is inherently risk-averse, slow to change. The good news is they know that they need to be increasingly employing these new technologies, but we do a lot of work around education and supporting our growers. The thing that I sort of say all the time now is that new technologies and tools are not just there to just solve one problem. I mean, essentially, when you start going digital, you're changing the way you have to think about farming and farm production. So way beyond, we spend a lot of time on education. We've got a relationship with a university in Mexico called SECOR. They only produce students who come out as growers and agronomists. And we're basically showing them that farming with a digital approach is different because you're able to make better decisions. It changes the way you think about farming, think about the plant, about the crop, because you're getting this real-time insight about what's happening with the plant that's, you know, objective because it's been assessed by data. And so that's really kind of the change, you know, the younger generation coming through. So people who are in their twenties and thirties are digital natives. So they're more sort of comfortable with this idea, whereas sort of like the established older growers, you know, they're the ones who often are challenged by this change. So, you know, the technology's there, but it's adoption still needs to be more and faster really for the industry to get the advantage. Pest and disease is another area that we focus on. So we've got growers in Mexico who, through being able to identify the outbreak or onset of a pathogen, have been able to take preventative action early. And the practice on the farm before they were using us was just to sort of blanket treat the entire farm. So you may have hundreds of hectares where they would just bomb it with pesticide or herbicide, you know, rather than only treating that area where the outbreak had occurred. So sort of that precision agriculture idea again of just be efficient with what you're doing. You don't need to overuse chemistry or biological treatments. You can target the area where the outbreak is, isolate it, and then you don't have to impact the rest of the crop production. So that's a kind of practical example. Another one in Morocco is more just about the ability to leverage data. They've got 10 farms that are spread over, I mean, they've got about 500 hectares of production of blueberries. Before they were using Way Beyond's platform, which is called Farm Road, they had no easy way of providing agronomy advice to the growers, because they have eight agronomists, but they're all in different parts of the world, and they often had to go and travel to Morocco to see what was happening. Now they do all of that just by logging into our platform and they can visualise, you know, the visualisation of all the data on the farmers there. And so whether they're in Australia or Scotland, they could help now manage the farm remotely. I think with the, you know, the average age of a farmer, when they say this, they're talking about You know, someone who often runs a farm is

around 60, you know, and that generation is retiring out from the industry. The real issue with that is the loss of the knowledge. I mean, they've seen many, many seasons of production, and farming is like an oral tradition. You know, you pass down your knowledge from one generation to the next, and sort of intersecting with that, you've had a lot of corporatization of farming. Family farm operators can no longer afford to be in farming. It's not economically viable. And so you end up with these large-scale roll-ups of farming that become these corporate farms. Now, some of those can go into a direction nobody wants, which is why you see, you know, the emergence of factory farming in the US with cattle. I mean, they're pretty horrible things. No one's really happy about food products being sourced from that type of commercial farming practice. Way Beyond certainly doesn't want to be involved in anything like that. You know, we want to be able to show corporate operators, you know, how they can be sustainable producers and produce crops in the best way. as that generation of farmers retire out, we're trying to capture as much of that knowledge as we can on our platform so that, you know, we can serve that up through the software, you know, to the new generation coming through. And then I'd go back to that whole premise of education. You know, farming is complicated. You can't just say, here's a new app, you know, good luck. You know, it's sort of like you have to, show them how to utilise that software insight to do better practices on the farm. So I'm a big believer in education. I just think part of transformational change is you've got to relearn. That's a really important part of what Way Beyond is committed to doing and our part of agriculture. And I think that's going to be really important in the years to come. We span everything now across pests and disease, irrigation, climate modelling, but really the secret is in prediction. So being able to predict on environmental change, being able to let operators and growers know about that before it happens. More advanced application of artificial intelligence and providing prescription to growers on what daily actions they should be taking. That's some of the stuff that we're working on. I think in the industry more broadly, what I see happening is like a fusion between what's happening in the area of crop genetics. Again, we're dealing with biological organisms, and I think this is what a lot of people miss about creating new technology. is you're dealing with living things, so you've got to sort of take a certain approach to what you're doing. For me, the stuff that's really interesting is around how do we combine work on better genetics, so better producing crops, crops that have more inherent robustness. to deal with a warmer planet or requiring less water, being more disease resistant. You know, how do we combine that with the sort of data and approach that Way Beyond's doing and bring those things together? And also there's lots of interesting things happening with satellite technology. There's a lot of companies, you know, sort of wrapping the planet and all sorts of interesting tech, you know, to sort of scan the surface of the planet. And so it's like, well, how do we take the value of that data as well and use that to transform food production? Probably the other thing I'll mention is just about where is all the food production going to be? I think this is another really important thing. You know, when people talk about

population growth and the challenge by 2050, The fact is, if you get underneath that statement, the West does not have a food production problem. We overproduce and we overeat, which is why we have the issues with obesity, with diabetes, because actually we're basically consuming too much and we're not always consuming healthy calories. Where a lot of the population growth is coming as the West's population declines is in places like Sub-Saharan Africa. It becomes more important to think about, you know, where does all this innovation need to be applied? You know, where are people going to need it the most? Africa is going to end up with the world's largest population and also the youngest population. And so we need to all be thinking about how are we going to support agricultural innovation in what's going to be one of the largest populations in the world. India and Pakistan being the other area. So there's some really interesting global challenges, but I really believe that there's enough entrepreneurs and innovators and players in the ecosystem that we can meet that challenge.