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TRANSCRIPT

Event

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Technical Demonstrations - TomorrowNow

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FEATURING

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Dr. Zane
Swanson:

OK. I think people are trickling back in. Thank you again for being here in person, and those of you continuing to be with us online. I've heard some really great conversations during the lunch break, been a part of a few/ I hope that was a good time for you to reflect on the morning sessions, some of the tech demos. It's now my pleasure to introduce the third demo of the day. And with that, Brian Miranda, CEO of TomorrowNow. Brian will present TomorrowNow's work connecting smallholder farmers with next generation weather forecasting technology in collaboration with farmer-facing organizations, government agencies, private weather tech firms, and research institutions building on, I think, a lot of the conversations that we've had earlier today. With that, join me in welcoming Brian to the stage. Thank you. (Applause.)

Brian Miranda:

Hey, everyone. My name is Brian Miranda. And I'm the CEO of TomorrowNow. And so what you see behind me is our north star vision, 100 million weather-resilient farmers across Africa. And with all the recent advances in AI, I think we've got a real shot of getting there. So what we are looking at is transforming the decisions that farmers make every day, the decisions that dictate success or failure with every harvest. And so weather uncertainty is one of the biggest drivers of food security – or, food insecurity across Africa today. And this is not just the big shocks, the droughts, the floods, the heat waves. These are the micro shocks or the changes, uncertainty, that happen every single day.

The reality is 90 percent of African smallholder farmers are rain fed. That means they don't have irrigation and weather drives pretty much everything that they do. So every decision they make, from when to plant, what to plant, all the way down to when to harvest, is largely driven by the weather. And the first question we get asked every time we speak to farmers is, when will the rains come? And so this is Maggie. She's a farmer in Nakuru County in Kenya. And she said the following when we met with her earlier this year. "If you plant early, the harvests are usually good. But if you plant late, there are challenges." And she ultimately relies on guesswork to decide when to plant every season. And that's the – again, the reality for most farmers today.

And where we're missing the mark, where most advisory and guidance happens today is at the county level, or even broader, where it doesn't actually match up to the local conditions that most farmers are experiencing on the ground. And so when you look at Nakuru County here, there's lowlands, highlands, different soil types, different weather patterns. The reality is for two different farmers the same event of early rains can mean something very different. So early rains can be a false start or an opportunity. So on a false start, you know, the rains might come in and then stop. There's a dry spell for many days. And you've planted the seeds, but they don't germinate, they don't take root, and ultimately you're left with diminished crop yield.

On the other hand, if you're able to capture the rains, and the rains sustain, then you get to a place where you capture the full growing season. And so a difference of even a couple of weeks, two weeks, can reduce yields by 10 to 30 percent, which is dramatic for many farmers. And most farmers can control the timing of when they plant. So this is a really big opportunity here. And so what we're trying to do is take this very broad advisory and localize that for farmers. So farmers should plant when the soil moisture is sufficient for germination, not just when it rains a couple days in a row. So we call this time period the suitable planting window.

And so what you're looking at here are three farmers, Mary, Rachel, and Joseph. And they each have different rainfall patterns. They have historically different soil moisture content. And we can provide them with different advisory today. So, whether it's waiting for the first rains to come, preparing when to plant, or plant now. And ultimately the way that we do this, it's a very simple recommendation at the output, but it combines a lot of different signals coming in. So we look at observed rainfall. So what actually happened? So we're pulling from products like TAMSAT, which are satellite-derived rainfall estimates. We're pulling from AI forecast models, so fifteen-member ensemble probabilistic forecasting from Google, where now we can generate 50 different scenarios of what's equally likely to happen and, ultimately, think through what that means for our confidence levels when we're generating advisories.

We're looking at 20-plus year climatology, so the historicals of what has happened in the past that can now start helping us look beyond the forecast window. So 10 to 20 days out, when forecasts are just not good enough today, we can start to understand, well, what was it like in that period in the past? Then we also look at land surface models, like JULES, to understand the soil moisture content for these farmers. And so all of these models are great. Predictions are great. But we try to calibrate them with the reality. And so we've got what we call our gold standard validation network, which is made up of hundreds of weather stations and soil moisture probes in the region. And we actually calibrate all of these different signals in to provide a blended estimate of when is the best time to plant.

And so, again, it's not just when will the rains come, but will these rains stay? Will they be reliable enough to give you the soil moisture you need to germinate your crops? And all of this does not matter unless farmers trust and act on it. And the critical piece for this is quality, accuracy, skill. And so we work with a number of partners, many of whom are in this room today, from the University of Reading, One Acre Fund, many government partners, like the Government of Kenya with KALRO, Kenya Agriculture and Livestock Research Organization, to battle test and field test these products. So, for example, with University of Reading and One Acre Fund, we've looked at over

80,000 farmer trial points going across many years in eight different countries to look at when did farmers plant and what was their yield. And so how do we correlate against historical patterns?

With in-season records, we're able to actually understand our recommendations matching up to what farmers are actually doing. And so we did a study of that with over a million farmer records last year in Kenya with KALRO. And we're also testing everything from message design and framing to message frequency to even farmer demographics and typology. Like is this farmer a dry planter or wet planter? That ultimately dictate whether or not a farmer will adopt a message. And so we've seen that farmers, time and time again, who plant closer to recommended dates achieve higher yields.

And the way that we deliver these messages, importantly, matters a lot. So it has to happen through trusted partners. It's not TomorrowNow sending messages out to farmers directly. We actually work with a whole host of partners, as Zane mentioned. Many of these are public institutions, but we also work with the private sector. And these messages go out to farmers typically once or twice a week. And so this is actually Maggie here, again. And we had a chance to catch up with her a few weeks ago, and this is what she told us. "If I had planted two weeks earlier, the soil didn't have enough water. It wouldn't have germinated fully. I planted at the right time, and now I'm proud to see how the crops are growing." And so we were actually able to catch one of those false starts with Maggie this season in Kenya, which was actually a much trickier season than normal where the rains did come early, and that meant very different things for many different farmers.

And, importantly, Maggie's case is not just an isolated one. So late planting actually hits women farmers hardest. So 47 percent of women versus 43 percent of men in Kenya plant late. And so I know that might not appear like a huge delta, but women smallholder farmers actually constitute the majority of farmers in Kenya and Africa. And even just the small percentage point means tens of thousands of women farmers are planting later than men on average. And so when we think about that it makes sense. Some women are getting second access to labor, to inputs like seeds, and then also to information, especially around technology usage. And so our suitable planting window model helps to close that information gap and get these farmers advice at the time that they need it so that they can make a different decision.

And then lastly I just want to close with just our vision. Again, it's 100 million weather-resilient farmers, but that needs to start in one field. So we need to look at the behavior science that will ultimately result in changing practices of when you plant. So we're live today with government partners in four countries, in Kenya, Malawi, Zambia, and Nigeria, where we're serving over 6

million farmers. We've also got a number of private sector partnerships that take us to a few new countries. And we're rapidly expanding and hoping to get to five to 10 countries over the next few years.

So our vision is only achieved through partnership and thinking about the quality of these models. The AI-based forecasting is incredible. It's starting to increase our confidence, starting to increase how we actually design these messages. But the delivery of that message matters just as much. And so at TomorrowNow we're combining both and bridging, really, this first mile R&D science and AI world with the last mile of farmer impact. So, yeah, just love to take any questions. And I'll be around all day. (Applause.)

Mr. Swanson: We have time for probably two questions. We can take them back to back. Raise your hand if you have any questions in the room. We have one right here, Emma. Right in the middle. And if you can, introduce yourself and stand up for us, for the cameras. Thank you.

Audience Member: Sure. Thank you. Mike Cecil, University of Maryland and NASA Harvest.

I think one of the sort of worries with a system like this is that does it accurately pick up on real, local scale variability, both in terms of soil and in terms of, like, the accuracy of the rainfall product? And does that have bias in certain areas versus not? And I'm just wondering if – how you've seen this work based on – for that question?

Mr. Miranda: Yeah. It's a great question. And it is something that we think about all the time. So one thing that we often see people confuse today is resolution with accuracy. And it's very different. So, you know, what we look at right now is at a nine-kilometer grid level when we're providing these advisories. And I think an important thing is not to be extremely definitive in saying, you must plant now. It's actually – that's why we've thought about this as a suitable planting window, where we provide farmers with enough context about the why in terms of the rainfall, and we're actually integrating in sort of the best available soil maps. So it's not perfect, but we are calibrating that against what's actually happening in the field.

And I think there is a margin of error as well. So when you tell a farmer, plant today, most farmers don't plant that day. They actually plant a few days from them. And so it's actually trying to anchor that point around what's happening around them. So I think there's a lot of variables in there, and something that you can always continue to improve. But the current guidance to farmers is usually far from sufficient, and at such a resolution where they can't use it at all.

Mr. Swanson: Great. We have time for one more question, if there is one. And if there's not, I have one. Ah, David in the back. The mic's coming to you right now.

Audience Member: The U.S.-funded initiative, Climate Hazards Center, and also FuseNet does a remarkably good job of predicting rain events months in advance. I think they've got seven of the last eight drought conditions in the Horn accurately predicted. And that's an ongoing existing investment. What is the case you would make for superseding that taxpayer-funded investment to this one? Why are you better?

Mr. Miranda: Yeah. So in my world what we're not trying to do is supersede anything. We're actually data and technology agnostic. I think what we've spent a lot of time is building the rails of how do you actually get this information out to farmers at scale. So when we think about the right partners that we work with, we actually work with governments for a reason. They have the mandate to reach all smallholder farmers, not just the most commercially viable ones. So I think when these types of products become available or are available we'd want to integrate them in. And so things like predicting the type of season, the characteristics of a season many months in advance is very helpful. I think where we started with is this real time weather information and how to bring that to farmers.

So questions around timing of when to plant is critical, versus, you know, other decisions, like what's the best seed that I should use which might be better adapted to this length of the growing season. And so I think there's a role for all of these types of innovations to come in. And so the way that we've approached this is by building what we call a global access platform, where we're pulling in the best in class models and products from the University of Reading, which is around suitable planting windows, or, you know, when we look at pest and disease advisory, working with groups like CABI. So I think, yeah, we'd love to consider working with that group, and add that in. But our focus has been how do we improve the value at scale. And then I think you can continue to add in new functionality.

Mr. Swanson: Thank you so much. Join me in thanking Brian one more time before we move to our next session.

Mr. Miranda: Thank you. (Applause.)

(END.)