Speaker 1:

Welcome to AgVic Talk, keeping you up to date with information from Agriculture Victoria.

Drew Radford:

Should I apply fertilizer or not? If so, how much? They're questions all producers face. But, imagine having detailed, real-time soil moisture analysis at your fingertips, that gives you insight to if your crop is readily going to take up that fertilizer, or not. For over a decade, a number of soil moisture probes across Victoria, have been gathering that sort of information, to help give farmers confidence in their decision making. To find out how it all works, I'm joined in the AgVic Talk Studio, by Dale Boyd, Seasonal Risk Agronomist with Agriculture Victoria. Dale, thanks for your time.

Dale Boyd:

Thanks Drew.

Drew Radford:

Dale, what is the Soil Moisture Monitoring Network?

Dale Boyd:

The network is what Agriculture Victoria set up as technology in 2010, to see if we could assist dryland farming systems to understand the seasons better, with soil moisture probes. Now, climate change and extreme seasonal variation have been very challenging for farmers to manage, but we just thought by putting in this technology in the ground, farmers then would have a way of measuring it, and if they can measure it, then they can start to manage the variations that we do see in year to year with rainfall.

Drew Radford:

In terms of the monitoring, is that monitored across a range of depths or is it just a standard depth in the soil that the monitoring's done?

Dale Boyd:

One of the critical components to the success of the Agriculture Victoria Network is that, 10 years ago, technology being well-established and utlised in irrigation environments, but not so much in dryland, where we couldn't apply water, so our strategy was to put these moisture probes down deep into the profile. Our form of measurement is to measure from 30 centimetres down to a metre, and with sensors every 10 centimetres, which gives us a good resolution of what's happening down through that soil profile.

Dale Boyd:

The other advantage with the position of that probe down deep is that, with cropping systems, there's the annual sowing of the crop, where you're looking to sow over the top of the probe. So, it's representative with a good plant population similar to the rest of the paddock. So, by having that probe down so deep, the sowing tines can safely go across the monitoring point, without damaging the probe or the cable itself.

Dale Boyd:

It's good to really emphasize that it's a deep soil moisture that we're really looking to track, because between zero and 30 centimetres, it can fluctuate pretty dynamically. But, it's about this time of the year, September, where those deeper soil moisture reserves are so critical to get us through, and get those yields that might've been set up through that winter period.

Drew Radford:

Is that a real-time feed?

Dale Boyd:

Yes, it is. We're getting data recorded every hour, and then the upload of the data from the paddock occurs on an hourly basis as well, providing we can get a solid mobile network communication connection. Every hour, which is fantastic. It's not only good for soil moisture, but also rainfall. We match up a rain gauge with the monitoring point, with the moisture probe. I think that's been a bit of an eyeopener as well, to be able to get the hour by hour recordings of rainfall. We can actually determine rates of infiltration with the intensity of rain. Generally, the rain's been pretty steady, but some events, particularly in summer, they can get up to 25 mm, even a bit greater in that hour period. Some of these soils probably struggled to take in that amount of rainfall within that hourly period, but it's a good measurement point.

Drew Radford:

That's a lot of data coming in very quickly, real-time analysis. Does the data ever surprise you?

Dale Boyd:

Initially. Everyone was pretty surprised how effective some of these crops were at extracting deep soil moisture. Probably in the past, things might've been underestimated in terms of soil moisture conditions, and that's probably due to just those shallow assessments, that might've been done with a shovel. So, by having this real-time measurement, or certainly being able to observe at certain points of time moisture getting down, right down to depths, a metre potentially even more in those really wet years. But, when we've got a great biomass of crop growing above that soil surface, we've also got that pump happening with that well-developed root system. I think that's been a real eye opener.

Dale Boyd:

The other thing that can surprise people is, just the effect of cutting crops for hay. We do find that the crops can be using moisture quite well during that day period. Then, from the remote assessments of the data, I can actually pick up to the hour, of when the crop was actually cut, because when the leaf area is removed, the crop stops photosynthesizing, stopped using water, and it's just quite a dramatic change. Some of the farmers have been a bit surprised how I've been able to remotely assess what they were doing on farm.

Dale Boyd:

There's a few other things, that certainly they've been eye opening, particularly summer weed escapes, and just the damage they can do in terms of quickly extracting moisture, and down to depths as well. Really, this is all the deep moisture that you'd really like to conserve, and have for the following winter crop, and not lose that through summer weeds. So, there's been a lot of learnings and probably a few eye opening experiences along the way.

Drew Radford:

You said you started this in 2010, so you've got a decade's worth of data. What time of the year then is soil moisture monitoring most useful, in terms of the data?

Dale Boyd:

That's certainly a long data set, and it's probably shown that the information is quite informative in all parts of the season, but when we've worked with the farmers and industry, and determined what they thought the most useful part of when they could examine the data, it was identified as spring. Personally I think early winter can provide some early guidance on how the season's progressing, and then moving into spring then, we have obviously seen it being quite dynamic, that if you've got crops with yield potential, they will certainly use a lot of water if it's stored in those deeper levels, within the soil profile.

Drew Radford:

Okay. Well then, how do producers actually apply that information, in terms of the monitoring data you've got?

Dale Boyd:

For the farmers and the producers to best utilise, the soil moisture probes, it's really about understanding the seasonal conditions for that reference point.

Dale Boyd:

So, the thresholds are the upper limits of the outmost maximum capacity that those soils can hold, and then also the lower limits. So, how dry those soils can actually be dried down to, with crop growth and development, which generally gets to those lower limits in that spring period.

Drew Radford:

A person with firsthand experience with those limits, is Bec Marshall. She and her husband Ash, run a cropping farm at Normanville in Mallee country, about 60 kilometres from Kerang. They've been using the soil moisture monitoring information for nearly a decade.

Bec Marshall:

We really use it to help us make major decisions during our growing season, and even pre-growing season pre-sowing the crop. It's probably one of the big confidence givers.

Drew Radford:

What information from it are you getting, that gives you confidence?

Bec Marshall:

Just a really good snapshot of actually what moisture we have stored in our profile, which then we can sort of translate across to what sort of yield potential we might already have, the potential going into the season with our crops. That can really provide a lot of confidence around rotation going forward, how hard to push things in terms of nitrogen inputs especially.

Drew Radford:

How long have you been using soil moisture information in your business?

Bec Marshall:

I think maybe it was 2011 or so. There's actually been a local probe installed in our area, just in our neighbours farm at Normanville, and Ash and I really started following that from the start, and using that information to provide confidence with what we were doing here. Then, I suppose maybe three years ago, we went and started installing our own moisture probes set ups on our own farm, just so we could get that really fine-tuned advice for us.

Drew Radford:

Has that made a difference over the last three years, now that you have even more data coming through, to know really what's going on, on your property?

Bec Marshall:

Yeah, I think it has. It's been great for our learning certainly, just to be able to learn what's actually happening in individual paddocks. Our farm is reasonably spread out. We've probably got 20K's difference from top to bottom, North to South sort of thing. So, that does vary quite a bit during the season, and also a range of soil types. So, we've been able to really learn a little bit more about what's happening there, and really get that information that's tailored for us.

Drew Radford:

Okay. So, give me a bit of an example then, in terms of looking at the soil moisture, and then what sort of decision you might make off the back of that?

Bec Marshall:

The major one, well, there's lots that we might make. I guess one of the major ones we looked at this year was our top dressing, how we're applying nitrogen during the growing season to feed the crop. That's where soil moisture has been really handy for us, just having that knowledge of what's actually in the profile. You can actually have quite a dry growing season, not be receiving a lot of in crop rain, but have quite a full profile underneath. Just having the confidence around feeding that crop, to make it reach its full potential, I suppose.

Drew Radford:

So what would actually happen there, Bec? Without that information, would you hold off actually applying the nitrogen, because you're unsure it's dry, and it's not going to be taken up? Is that-

Bec Marshall:

Potentially, you could find yourself in the situation. Without that information to provide the confidence that your crop might actually have a better yield potential than what you're thinking, just based on your current rainfall, yeah. So, you might end up under feeding that crop nitrogen, and it doesn't reach its full potential. So, it can be that real signal, I suppose, to go harder in the right season, or also, it can be the reverse too. If you don't have the moisture in the profile, you could, as often happens in the Mallee, have a really fantastic looking crop early on in the season, and absolutely nothing in the profile, and just also needing to pull things back a little bit and not go too hard. So, there's the reverse here as well, I guess.

Drew Radford:

That is Bec Marshall from Normanville. If you're a producer and you're interested in finding out more about soil moisture monitoring, Dale Boyd says, there's a range of information that's readily available.

Dale Boyd:

Go to the agriculture.vic.gov.au webpage and search for soil moisture monitoring, and you'll come up with all the links and the background description of the Dryland Cropping Program. They've also developed recently, with the assistance of the Dry Seasons Program, a new dashboard. That's on extensionaus.com.au/soilmoisturemonitoring all in one word. That dashboard's been a really great development because, it not only provides an indication of the crop or pasture that's growing, because that obviously has a very big influence on soil moisture increases at the start of the season, but also the rate of depletion that you might see in late winter, and coming into spring.

Dale Boyd:

So it's good to have that description of what's happening, because obviously, these reference points are quite important, and if farmers and industry are going to take more note of them, there's obviously an indication of why they're being depleted at the rate they were, due to what is growing at that reference point. So, both sources have good information.

Drew Radford:

Dale, it's a phenomenal amount of information, and an amazing resource for producers to access. Seasonal Risk Agronomist with Agriculture Victoria, Dale Boyd, thank you for joining me in the AgVic Talk Studio.

Dale Boyd:

Thank you very much, Drew.

Speaker 1:

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Speaker 1:

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