Heather Field:

Hello, everyone and welcome to today's webinar, which is on Victoria's seasonal climate outlook and soil moisture update for autumn. My name is Heather Field, and I'm a climate change service development officer with Agriculture Victoria and we'll be facilitating today's webinar. Before our presenters begin, just a few housekeeping items. This webinar is being recorded and will be made available after today. You are currently muted just to stop background noise. If you do have a question, please use that chat function which is currently explained on the screen and we'll make some time at the end of our presentation for questions. There will be a quick survey following the webinar which will only take a minute to complete and it'd be great if you could complete that when you exit out. Before we commence, I'd just like to acknowledge the traditional owners of the lands and water on which we are all meeting and I pay my respects to elders past, present and emerging. I'm tuning in from Ballarat, which is the land of the Wadawurrung people, and I'd like to acknowledge all the lands on which everyone is tuning in from today.

Today, we have a great opportunity here from two of our Agriculture Victoria Seasonal Risk Agronomists, Dale Grey and Dale Boyd, also known to us as the two Dales. Dale Grey will be first up and he'll be providing an update on Victoria's climate outlook for autumn and focusing on the current seasonal climate outlook and climate driver activity. Dale Boyd will then be providing a seasonal update on the cropping and soil moisture conditions as measured by the Agriculture Victoria Moisture Probe Network, including a review of the distribution of summer rain and how the season is tracking. A little bit about our presenters who will be familiar to many of you online today. We've got Dale Grey, seasonal risk agronomist with Agriculture Victoria where he has worked for 30 years, and Dale provides agronomy, climate change, climate and weather analysis for farmers, agribusiness, government and the media across South East Australia. He's the author of The Very Fast Break, and The Fast Break climate newsletter and produces a monthly YouTube update called The Very Fast Break.

In 2022, he was also a recipient of Grains Research and Development Corporation Seed of Light Award for excellence in grain industry communication, so we're very proud of Dale. Dale Boyd is a seasonal risk agronomist also with Agriculture Victoria and is based in Echuca. He's worked with the department for almost 25 years, and during that time has worked on a range of projects linked to monitoring soil moisture and irrigated cropping. This work is a statewide technology adoption project that uses deep soil moisture probes and weather station networks. Dale helps Victorian dryland grain farmers and advisors interpret seasonal risk information to aid in their decision-making using soil moisture probes recording data from down to one metre. This data obtained from the moisture probes is interpreted and presented in monthly e-newsletters, which aim to be educational on the use of technology and informative on the seasonal conditions. Very exciting to have both Dales together today to give us this seasonal update for Autumn, and I'll hand over to Dale Grey to get us underway.

Dale Grey:

Thank you, Heather. Well, good afternoon, everyone. Greetings from the ancestral homelands of the Djadjawurrung people here in North Central Victoria, specifically Bendigo, where it's overcast and mild. As we have done in previous webinars, we're just going to do a bit of a brief verification of the previous three months. This is the climate predictions for January to March of this year and what actually happened. We had a couple of models predicting drier. We had one model predicting wetter. We had a couple with a wetter eastern half of Victoria. We had a bit of variation, a northwestern dryer from the BOM, north central and far western dryer from the statistical one, but a fair number of them sitting on the fence at neutral, a code for anything could happen. As we know, well, it's a very mixed bag. It was definitely wetter through parts of the Southeast Mallee, northern country into the northeast, but it was very much drier along the south, particularly the southern coast, and particularly there at Cape Otway, driest on record for that period.

There was plenty of model predictions for warmer and that in fact is what happened. Not significantly or dramatically warmer I should say, just due to the absence of extreme temperatures over that period, but warmer than the 30-degree average, which is often in the North, at least, lots of 31, 32 degree days. Decile eight to nine, was one to two degrees warmer and that was sort of similar up here in the far northwest, which is decile 10, and the minimum temperatures were generally warmer across the state and certainly, decile 10 and warmer in far east Gippsland. Let's just have a look at where we sat for the rest of the country for January and March. Well, it was much wetter in the top end, driest on record in parts of NT, but certainly, dry along the western Australian coast and really dry from Albany around to Bunbury there were the driest on record in that region.

Everything, a complete mixed bag. That drier trend continued along the coasts of South Australia, sorry, and into the mid-north and generally, Tasmania was much drier too. We certainly had some slightly drier up there in the New England table lands and in from Rockhampton. Generally, a wetter trend, particularly over the inland of Australia. Temperatures were warmer and warmest on record in parts of the interior of South Australia and along the west coast of WA. Some of those temperatures were three to four degrees warmer each day of that 90-day period, which is quite an extreme anomaly indeed. Most of these areas are two to three degrees warmer in the decile 10s and one to two degrees warmer in the decile eight to nine. It was a bit cooler with all that extra moisture up there in the Northern Territory. Minimum temperatures were also warmer, warmest on record at the top of South Australia and also in the Cape and along parts of the Queensland coast and top of the NT and out there around Broome.

We look at the rest of the world, looking at rainfall anomalies here, wet anomalies in parts of the UK, Tanzania, Oman, Indonesia and Louisiana and Mississippi. Drier anomalies through parts of Quebec, British Columbia, Botswana and a heap of other, Zimbabwe down here as well. Was warmer, certainly, warmer along the Arctic Circle and a really big area which has been common now for, well, almost halfway, well, six months or more. From Europe, Eastern Europe, lots of Stan countries, through into China. Some of that area there is six degrees warmer than normal for each day of that 90-day period. The only area that perhaps was a little bit cooler is the coastal fringe of Antarctica, and I would be guessing that, that had something to do with the positive southern annular mode that we've had over that summer period. Let's look at April to date. Who's had a break and who hasn't? Well, basically the Mallee is still waiting. Much of the Wimmera is still waiting and much of the western half of the southwest is still waiting and some parts of the Northeast are still waiting as well.

Basically, the people have had 25 mil over that April period and certainly, 50 mil, absolutely grass away and going. The 25 to 50 area is drying, drying trend at the surface there, but a lot of these areas have got moisture underneath which Dale will talk about, and that 25 millimetres has linked up with that. Anything that germinates we would expect would be up and away and going. In terms of normal to date, you can really see that southwest corner there, which is 20 to 40% normal so far for April and we're halfway through the month. Looking at some seasonal conditions now, this is the vegetative health index where fluoro green is relatively normal, the red colours are where things are stressed. This was back before the rain in April, so that sort of just at the end of March, really just showing that it's parts of Central and East Gippsland that were looking good there and some parts of West Gippsland as well. The vast amount of the state at that time had really dried off quite rapidly.

If we look at the NDVI, how green it looks from space, but this is the anomaly where things are not looking as green as they should for this time of the year, and this is for the last 10 days of March and it's really showing that, that southwest section was looking not as green as it should as was West Gippsland into the northeast and you can see that, that trend continues or did continue right up through the, well, the western plains off the western slopes of New South Wales. If we look at the grassland curing and that's a bit different because we've got no shortage of green tinge over large areas of the country at the moment, but that is overwhelmed by the amount of dry material that's still sitting on the top. It's really only Gippsland that has had a continuing green trend through the whole of the last, well, over summer essentially, whereas everyone else certainly dried off.

It's going to take some time for that satellite imagery to pick the green coming through from the stubble remaining and the dead grass that's in most other areas. Let's now move to the climate. Our latest sea surface temperature anomaly chart. You might've heard yesterday that the Bureau has announced the El Nino is dead, and that is true. We've finally got below that 0.8-degree threshold in here. It's currently 0.64 degrees. That was the last thing we were looking at to see to make sure the El Nino was dead. All the other indicators that we look at have been dead for a little while. We can see the whole Indian Ocean is very warm, particularly warm off the coast of East Africa and also warm in this Sumatran box. Yet for a few months now, we've been seeing a positive Indian Ocean dipole measurement because of the extra warmth in this western box. We're not seeing a cool slug sitting here, but because of that, we're seeing a positive IOD-like number, but we can't have a positive IOD in April. That's not physically possible.

We could however, start to see one in May. That would be as early as we potentially see. We're really looking for the northern wet season to stop before the Indian Ocean shows its hand. As we'll see in the coming slides, that's the interesting thing at the moment, what's happening in the Indian Ocean. The other thing is the hang around smell that's been going on for, well, more than 18 months now, is that just the ocean temperatures to our northwest, northeast, sorry, up in the Coral Sea are very warm, and of course, this is what never changed last year through, well, winter and particularly into spring and over summer is that this zone up here, which we would've thought should have cooled off with last year's El Nino just chose to never do that and so was a good moisture source. Particularly once we hit summer, that zone up there was completely switched on and we still see that area up there able to deliver incredible rainfall as we saw a couple of weeks ago along the eastern coast.

Looking at the cross-section of the Pacific Ocean from Ecuador across to Papua New Guinea. Along the equator, you can see a comparison between this time last year and now how we're completely different. Last year, it was all talk about El Nino. This year, it's all talk about La Nina. That's because we have this cold slug of cold water to depth which has completely nullified the El Nino at depth now, and this is what we call a pre-La Nina condition. If you're going to get a La Nina this year, well, you would expect it to look like that. Just because it does, by no means, means that you will get a La Nina. We would need to see that cold water upwelling at the surface. At the moment as we showed there, there's almost none of that happening whatsoever. Maybe some of this is just a very early signs, but until we start seeing some cold outbreaks starting to happen along the equator, we won't be seeing any surface La Nina activity, even though we currently see a pre-La Nina signal there in the undersea.

If we look at the Indian Ocean, this is the top 150 metres averaged out where the pink line is completely normal. We see over in that western Indian Ocean, sorry, off the east coast of Africa that it's much warmer and we see generally that the eastern half of the Indian Basin is much cooler. Although, we do see a slightly warmer bit just here off Sumatra, which is a bit interesting. That's only appeared in the last little while. Keep that in mind though when we talk about the predictions for Indian Ocean positive IOD. In terms of the cloud patterns, there's nothing going on really out in the Pacific Ocean, it has reverted to normal. What hasn't reverted to normal is the Coral Sea. It's still got plenty of cloud above it as a result of that warmer ocean and we can see that there's been plenty of cloud evolution through parts of the top end Queensland and Northern New South Wales, but Victoria across the WA has a lack of cloud trend given our lack of rainfall for the last while.

You can see this massive lack of cloud up in the Eastern Indian Ocean and an abundance in the Western Indian Ocean, which if this was the middle of winter, would look very positive IOD indeed. I'm hesitant to say that, that is the case because I suspect we still have northern wet season monsoon effects going on here, and it's not going to be until we get to the end of April and the monsoon breaks down and we're into the dry season that what we see up here might start to reflect the climate that we might have going into the next few months. The one thing that that is at least in the short term is that, that's not a great pattern for anything you're hoping to come out of the Indian Ocean, particularly for WA and South Australia and into Victoria as well. The zone up here is still switched on, which means if you got the right system, you could certainly pull moisture from straight down there as well. It's very much a Pacific Ocean switched on and an Indian Ocean busted sort of effect there.

This is the bit that's really interesting at the moment. These are the trade winds in the arrows and the colours show how much faster they're going than normal. Nothing to see in the Pacific Ocean. If we were to have a La Nina, we are going to need to see much stronger easterly winds in this zone here to get that water to up well cooler, push the warmer water to the north of Australia and hold it. Currently, we see nothing going on in terms of that. What we do see going on is in the Indian Ocean where for a number of, well, weeks now, almost a month, we've seen much stronger than normal easterly wind in this zone, which is kind of sniffing and reeking of positive IOD formation. If that continues on, we can't help see water being pushed over to the west and water upwelling in this area, which could turn out to be cooler.

What's interesting is that even though that's been happening, we see no signal yet that anything is cooling off the Sumatran coast. However, every climate model can see that, and keep that in mind with the predictions that we'll be showing soon. In summary, despite all the talk about a La Nina, it's only the ocean to depth that's remotely interested in that environment. The surface, the pressure winds and cloud couldn't give a hang. The positive IODs of the Indian Ocean is basically saying hold my beer, I think, because its sea surface is not positive IOD-like, but gee, there's a lot of warmth off that coast of Africa which could certainly be driving things. The ocean to depth pressure winds and cloud certainly look a bit positive IOD-like, even though I said we're not having one, we can't have one, but they're already sitting at that pattern if it wants to do that. As we'll see soon, there's no shortage of models that are interested in a positive IOD this year.

Let's look at the southern annular mode that measure of the system spinning around Antarctica has been spending most of summer in its positive phase, which has moderated our temperatures and also probably helped to increase the rainfall in parts of the state and was unexpected in terms of the fact that we wouldn't expect an El Nino year summer to have a positive southern annular mode. We'd expect a negative southern annular mode, but it's most likely that the, once again, the water vapour from the Tongan Volcano in January of 2022 that made its way down to Antarctica and affected the summer of '22, '23 has possibly affected the summer of '23 and '24. I would hesitate to say that the science on that is not settled, it's certainly an area of active interest in research and debate at the moment, but it's certainly plausible that, that has happened in terms of beating the El Nino and keeping things like that over summer.

You can see that once we reached autumn that things spent quite a negative phase there in mid-March. They were strongly positive at the start of April. In autumn, the southern annular mode is all over the shop and can often mean all sorts of things, so it's not something we kind of look at. If it was winter, we'd be thinking a positive southern annular mode would mean the systems have been dragged south. Currently, it's moderately positive and we get a bit of a divergence here from the NOAA. The American Bureau predicts it to come back to sort of neutral. The Bureau of Meteorology predicts it to go down to weekly negative in the next fortnight. Now, this is where we're really in trouble here at the moment, pressure, and that is completely often the case at this time of the year in autumn. We live and die by what pressure does to us in autumn.

At the moment, the centre of high pressures have moved up a little bit. They've been in a very strongly summer position up until a couple of weeks ago. Now, we of see that the centre of that pressure is starting to move a bit further north. Remembering that the centre of pressure for winter should be at the top of the bight and around Melbourne in summer somewhere over Adelaide would be a normal position for autumn. The real issue though is just the absolute positioning of that dirty big high on average there off the coast of WA, which is sending the frontal stuff perhaps a bit at the action for Eastern Victoria, but that's very much a blocking pattern for South Australia and the western half of Victoria, and particularly that southwest corner. If we look at the pressure anomalies, well, we can see that pressure down there, and if you've seen some of those pressures, there've been like 1,034. That's a wintertime pressure pattern down in that area, incredibly slow moving, which means that, that blocking pattern is just sitting there for four or five days on end and we saw that last week.

This needs to change. If that doesn't change, a drier trend is likely, I suspect. We're going to need to see a decent gap in amongst those high-pressure systems for something to sneak in there, get a front coming through and potentially get some connection to the tropics. Just in terms of the tropics, Darwin, close to normal, a little bit higher in pressure. Tahiti, normal to a little bit higher. The SOI is currently negative 3.3, that's completely normal. We'd be expecting to see a value of, well, negative seven for El Nino, plus seven for La Nino. We'd expect to see lower pressure to the north and higher pressure off Tahiti if we're going to start seeing the pressure patterns behaving La Nino-like. Which brings us to the model summaries for April. Using the April model runs, we just have one model that's yet to update its temperature and rainfall predictions, but all the others have. Model skill at this time of the year is moderate, but some models are definitely low, and particularly in the south, the southern part of Victoria.

Predictions for the Pacific Ocean, remember we've just come off the warm El Nino. Some models keep that warmth hanging around. Some people sit at a normal. Two models bring in what we'd call an early La Nina, and some are just cooling that down a little bit. Where you can see we're starting to see some consensus though is that with the exception of three models, five of the individual models and all of the ensembles which are collections of large numbers of models from around the world and include some of these but plenty of others as well, predicting some positive IOD pattern, particularly with cooling off Sumatra rather than that warm trend. There's definitely cold blobs appearing in many of those models. That is going to be interesting to see what happens there. What is interesting is the predictions for rainfall, which for the vast majority of Victoria are completely sitting on the fence at neutral. That's code for plan for anything.

There are some drier trends though. There's two models there with a drier trend across the whole state, but there is 1, 2, 3, 4, 5, 6, 7, 8 models which have a drier trend for the southwest of Victoria, which concerns me if that is true, that wouldn't be what they'd be looking for. That sort of really does wreak of that pressure pattern and perhaps the southern annular mode going positive into that winter period, cutting the rainfall out there. I don't even know whether to believe this, I suppose at this time of the year, it's usually at a time where I'm telling people to ignore forecasts, and most of the time they're sitting at neutral. What is interesting is that over the last four months, the January forecasts had three models, I think, that were predicting... I need my bit of paper here. I wrote this down. There were three models with a drier southwest for January, February, March. In February, there were four models for a drier March, April, May.

In March, there were six models for a drier April, May, June, and now we have eight models sniffing a drier May, June and July in the southwest. It seems to be a developing trend and it's the only part of Victoria for where that sort of signal is anything other than sitting on the fence. All the models, however, are predicting warmer. If we just look at the absolute crystal ball gazing here, a fair number of the world's models, I would say probably a majority now are bringing in a La Nina in that late winter period. The vast majority of keeping the positive IOD going or you would perhaps note that the North American ensemble has had a positive IOD and then killed it off, so an earlier one flashing away. Those trends for warmer temperatures are continuing. That's because basically the ocean is very much warmer than normal around the outside of us and that's really helping to pre-eat the air masses, it sort of comes across.

Just in terms of what that means, La Nina made a November rainfall terciles here, plenty of chances that would lead to a wetter season. Almost 50% chance, historically, but some chances of it both being drier and average in the red and the yellow. That is opposed by the positive IOD chances which are 50 to 60% chance of it being drier, but some chances of it being wetter and average as well. That's a very interesting position to be in where you've got those two climate drivers as being predicted. Just in summary, Heather, a possible La Nina, but early days, wouldn't be getting too excited, so much yet to happen, and as yet, we see nothing going on. What is potentially of more concern is a possible positive IOD, but at this time of the year, predicting positive IODs is really, really hard.

About a month out as about as good as you get. What is interesting though is that the atmosphere does seem quite primed there at the moment to want to be positive IOD. It's really those strong winds which you would need to see to help to kick off a positive IOD and we currently see that. That's going to be worth watching. At the moment, the pressure patterns are completely unfavourable and that needs to change, and because autumn will be autumn, and that is often our case in autumn that pressure doesn't like us until it does. At this time of the year, unless you're probably in the southwest, the rest of us are going to have to concentrate on weather forecasts because that's about the only thing that'll give us any predictability out to seven days.

The climate model sitting on neutral won't be all that helpful, unless we look at perhaps the Bureau's, the monthly and weekly, sorry, the weekly and monthly forecast and other models that just look out that month might be some signal in that. At the moment, there's not much, and making our decision on the things that we know. Have we had a break? Have we got green grass growing? Have we got a profile of moisture? How are our feed and our water supplies? They're the things that we can measure, whereas we have no idea what's happening coming in the next three months, really. In summary, lots of neutral forecasts for rainfall except if we're in the southwest and likely warmer temperatures. I will leave it there, Heather.

Heather Field:

Thank you, Dale. Very interesting. We have got a couple of questions in the chat, which I will leave until we've heard from Dale Boyd, but we'll get your presentation up, Dale, to add to the story of what is happening going forward. Wonderful, that looks great.

Dale Boyd:

Okay. That looks all right, does it, Heather? Yeah, fantastic. All right, welcome. Well, I'll start off by giving an overview of the seasonal moisture conditions that I can review and that's going to be reviewed from a number of sources, but it's models, moisture probes and tapping into a whole range of networks that are out there publicly available. I've got a few references to Normanville, but essentially, this is an AGVIC telemetry unit west of Kerang recording deep soil moisture, and probably typical of what some of the paddocks might've looked like in that summer period with that summer storm. Some emergence of volunteers and also, the germination of summer weeds. They can be quite damaging if left uncontrolled, but most of the circumstances that I'll be reporting on this afternoon, they're being controlled.

In terms of getting an overview of soil moisture, we've got this Australian Water Outlook, the model from the BOM, plenty of historical data to then come up with some decile ranges in terms of soil moisture and that's from 10 centimetres down to a metre. Then we've got the reference points there highlighted in yellow of where we can pick up moisture probe data and see if that's going to align up what we're finding. I guess there's some moisture at above average range through this west Gippsland and a scene going right up there to the Mallee and we'll come up with these a bit of a common trend and theme with the southwest being on that drier side. Essentially, this is what the Bureau has and it's generally aligns up quite well with the perennial pasture species where it rains and it'll be consumed where we can certainly see some differences with the cropping scenarios.

During this presentation, I'll have all the links of where you find these information sources and then I'll compile them as a summary at the end as well. Another way of looking at the Australian Water Outlook model, but putting it into a moisture percentage, and then we've also got the moisture probes. A big shout-out to the probe data, which is being a contribution from not just AGVIC but these farming groups as well. This is traditionally what we've highlighted and shown, the soil moisture in the break information products. We'd look to review what the moisture is currently and what it was a month ago and then we can give it a rating of whether it's been an improvement and that's on 10%, or whether there's been a drying trend. Again, that's highlighted in red if it's greater than 10%. Recent rainfall in that last month period has got those improvements around Gippsland.

There are some very low numbers that are showing up still in that southwest area. In terms of when you look at the cropping, and we'll go into that a lot more detail later on, pretty high ratings but no significant change in the past month. That's due to the position of the moisture probes which are down deep enough that it needs a substantial break to have infiltration to reach them at 30 centimetres with the cropping ones. They're all listed as plant available water, so that's a pretty important factor to look into and it can take a bit of work to get that plant available water percentage. I'll just go into a bit of an example of use that Normanville scenario again. Shout-out to the friends out there at Normanville Cropping Group. A presentation out there last week just to highlight their current seasonal conditions.

What we've got here is a really long data set. When we commissioned these probes in 2011, it was a pilot to determine the value and the use of measuring deep soil moisture, what value could it add when we couldn't apply water. What it's really shown is, and this is the black line, essentially the trend line showing moisture changes over that long period of time from 2011 across to '24 now, and it's all the combined sensor values from 30 centimetres down to a metre. In terms of a percentage full, we've got our field capacity point, which were established in '16 and '17 and we're certainly experiencing that currently, and then the lower limit as well. Anything in this green zone is plant available water and then we can get a percentage depending on where that current line is at. Just having some issues with uploading data from that site currently. That's on the action items for me to address.

When you look at the long-term data, it just shows in a medium rainfall zone, a soil type that's got reasonable water holding capacity but does take a substantial amount of rain and sequences of rain events to have infiltration down to depth. We can see the challenging years of '13, 2015 where it really struggled to even show up at that first sensor at 30 centimetres. Then the more positive years in '16 and '17 and '18 was a challenge, but it just shows that we can carry over soil moisture from one year into the next that can contribute to the winter crop the following year, which is an important factor. In terms of how quickly we can establish these fill capacity and wilt points, it may take many years, but you can look at 2017 we had a field capacity point in winter and then a very dry finish to that season. We've got a lower limit established there, so it's just the luck of the draw.

There's certainly been a lot of work being done on this site and soil type, so it's fully characterised and it's got a water holding capacity of 164 mil down to a metre. I guess that's fairly complex, and what I love to do is simplify things. I got some funding, drought season funding in 2018 and commissioned this dashboard in 2020 to simply show those plant available water values with the use of a dashboard and just colour-coding, the moisture percentages split into quartiles, blue is the wettest and above 75%, and red is below 25%. You click on that link, so that'll be shared. I guess the important thing is that it's a little snapshot, the fuel gauge will indicate what the current moisture conditions are. If you click on details, you'll pop up with more information, which is pretty essential to get a greater understanding of the soil type and what's growing at the site. Just the information there that would pop up with Normanville, and last year was a crop of lentils. Again, it's talking about that soil type that's water-holding capacity.

The simple pop-up dashboard will show the shallower sensor for soil temperature. Each sensor is being calibrated, so we'll give an indication of plant available water at each sensor. The fuel gauge, and then that short-term rainfall outlook that I look to get from Dale Grey's assessments. This is updated in the second half of the month each month. This is the older one, Dale had the updated one. For the March update, it had 12 of that neutral and then Dale indicated that now that's back to nine and with a swing into three, into that dry indicator. As a quick snapshot, there's some essential information you can acquire. I guess the dashboard has got a combination of both cropping sites and pasture sites. With the drop-down menu on the dashboard, we can either activate all sites, cropping sites, or grazing sites. We've activated the grazing sites because it will show that perennial nature and that moisture use that we do see with these sites that rainfall infiltration, a perennial pasture will look to acquire that water.

That's why we're still sitting with sites less than 25% in that southwest, some wetting up there in West Gippsland and the northeast still sitting on that dry side because we've had those recent dry conditions, particularly in the last 10 weeks, which I've got some slides on that. Cropping, just activating the cropping ones, a lot of that rainfall fell post-crop maturity. With adequate summer weed control, we're still looking at in terms of colour-coding them, plenty of sites that are still sitting at above 75% plant available water and Southwest being on that drier side. What's influencing the deep soil moisture currently, I'm just going to pull up some Bureau rainfall charts and I'll look at the deciles. From deciles, for the three-month, looking at November, so the start of November to the end of January. During that period, there was three significant rain events. The end of November, so when harvest was looking to commence, there was two rain events coming through there.

Christmas Day was a bit varied but pretty significant within Central Victoria. Then January, there was multiple events and high-volume rain events that we could certainly track to see infiltration in those areas that did receive that rain. Probably when you look at it as an overall, a fair portion of the state is looking at above-average rainfall. We've got improvements, but when I'm trying to fine-tune and find out where the better infiltration was and where the better conditions currently are, this might be a better reflection of it. That's reflecting the January storms so that in the first half of January we're looking in these areas here that have still got that decile 10 overlay. Certainly, of recent times, it's been very dry, and the decile ratings, and this is from February, March, so those two months. A lot of the state is looking at below-average, little portion here in the northeast sitting on average. Some really dry months experience.

That is where it's interesting, it's pretty dry and crusty on top, if you haven't had some rain 1st of April and might've contributed to an autumn break in those areas. We are measuring the deep moisture, so in terms of trying to illustrate what we're measuring, we've got a gap in the measurement because we're looking to have the capacity to sow and cultivate and do paddock operations over the top of the probe, so we've got no measurement there. Then generally, the measurements start from 20 centimetres or 30 centimetres and measure right down to a metre or beyond. That's been the critical component. Put the probe in down deep, measure deep and don't disturb it. Just the internals of what a moisture probe looks like. When we put the probe in the ground, we're also connecting it to a telemetry with the cable being trenched at that same depth so we're not damaging the cable at all with the instal.

With that, I'll go into some of these specific sites to just illustrate what's happening with those. I will bring up the southwest, so it's talked about each dry trend, not just summer, but progressing into autumn. It's the dashboard view from AGVIC. It refills pretty regularly in most winters, so last winter, looking at 100%, but the dry finish and a canola crop growing, we've got that full moisture extraction over that period of time. Ended up being very close to zero. Some storms in late November and then into December, but really very marginal in terms of infiltration and whether there's some summer weeds escapes there or not, sometimes there's a bit of a de-water strategy. An overview from this site at Hamilton where it has been characterised as all with a fairly large water holding capacity with its clay soil type there. Very low moisture plant available percentage sitting there.

I'll go through some other regions and I'll tap into some other networks because I'm looking to promote that there's plenty of information sources out there. This is the one with the Wimmera CMA, so a shout-out there to Dutchie who had a wild idea to bring in data from as many data points in the Wimmera as possible and have it publicly shared, and then well done to Bromwind for bringing it all together. It's a ripping site, not only for soil moisture but for weather observations as well. This is the capacitance values as they're collected and as they stand at the moment. Colour-coding, I wouldn't take too much notice out of that, but in terms of the individual sites, that's where I get my particular information to get some of a reading of what's happening at these particular sites and with an emphasis of the Wimmera.

Why I like the site is it's got the stacked or the summed soil moisture trend lines, and they're pretty smartly stacked and highlighted each year. We've got '22, 2022 here with our wet spring period. 2023, the season we just had and where we're progressing now. With '24, you can easily switch these off and on. Eventually, they've got to get cluttered, but yeah, what a value they've got at this stage. We're looking to see some repeatability with an upper limit, which we do see with the wet spring '22, and in a lot of sites last year. June being so wet, that was the month that had the infiltration. When we see pretty much no change, that indicates that there's no infiltration down to that measured zone with the capacitance probes. This was a crop of wheat last year. We can start to see this rapid drawdown in the dry September and October that it was experienced last spring finish.

As a summary, this could be almost be somewhere near a lower limit, and how I can identify that is that, as I said, this BushLinx dashboard website, it displays the individual sensors pretty smartly as well. It's stacked with the upper sensors, which is from 20 centimetres down to 70 centimetres, and we can see that down at 70 centimetres at the start of October, this wheat crop was really ripping into that moisture. Then they also looked to look at the deeper array of sensors. That's from 80 down to 1.3, and probably it doesn't surprise me anymore, but it's a real opener of what the capacity of a wheat crop has. If it's got high-yield potential and its water requirements aren't met by rainfall, it'll look to deplete those deep moisture reserves. In terms of infiltration and improvement from post-crop maturity, I've got a summary here that it looks like 20, 30, 40 and 50 have had definite improvements and probably got back up to that saturation fuel capacity point from identified in 2023.

They're all quite wet, and I'm probably thinking there's been partial movement and that's been observed at these sensors here and even at 80, maybe at 90. There is some moisture down at depth, but you wouldn't say that that's at fuel capacity beyond 50 centimetres. That's at Jung, to the northwest of Horsham. When I look at the Warracknabeal site on the BushLinx platform, but also looking at Brim, so sort of coming in that same area. A bit more noise on the summed line, but essentially, we've got lentils in 2022, a canola crop, maybe getting probably near that field capacity point and then that depletion during that September and October period where rainfall wasn't meeting the canola requirements. That's all shown there on those individual sensors. Then in terms of the moisture improvements, post-crop maturity, we've got here 20, 30 and 40 centimetres, and maybe marginally at 50. Really, it's more in that 40-centimetre improvement.

Then that aligns up with what I've been observing at Brim, not too far away. Sensors stacked at 30, 40 and 50, have picked up from the January rain event and probably some contribution that didn't show up at the 30-centimetre sensor, but it allowed it to wet up. Then the following rain that we observed in early January, that's when it started to make its mark. There's been some partial replenishment, and probably just noting that this was a lentil crop so it didn't fully deplete those moisture reserves last year. We can see that with crops that have lower water requirements, smaller root mass, less plant growth above, doesn't have the water use that we do see with your cereals of wheat and barley and your oilseeds of canola with that large canopy. That's what's happening out there in the Wimmera as a snapshot.

I'm just going to tap into the Murrayville Landcare Network. I've got the site there at Cowangie for Mallee reference. Another dashboard display, it's showing similar things, so stacking the sum line where we can get a review of what happened there in '22 into '23. This is the growing season of '23 and where we are now in moving into 2024. Again, that kick up that we observed in June last year, a veg crop last year planted, so potentially your cereals might have depleted more moisture as I'm expecting that veg would've been cut around about this time here where we can observe that there's been no more moisture to depletion. That would align up with the dry matter and that crop residue being removed and stopped with a hay cutting process. In terms of moisture improvement, late November and then early January, individual sensors align up with the early January rain moving down to 40, 50 centimetres.

Then the more significant improvement with the generally rain where we've got the alignment here of sensors. It's a 1.2-metre probe, it's probably a smart use of a probe these days to measure deeper because we do know that the crops will use the deep moisture when required, but it's certainly been detected at 1.2 with that early January rain. This is the last site that I'll do in review this afternoon. Youanmite, so over in the northeast, this is also on my list of things to do is to fix up the rain gauge. It's just continually getting blocked by birds, so we need to put some more bird protection devices on it. It's a site that also does regularly wet up, so it's got that field capacity point there and probably looking at some saturation last winter. This is all the plant available water zone, a high-yielding wheat crop being grown there.

The moisture depletion started where September was dry. Fortunately, this is a hundred mil, so this is pretty amazing that with this summed line combining all the sensors from 30 down to a metre. A hundred mil, still didn't refill the soil profile, just showing how dry it was and how aggressive that wheat crop was in depleting the moisture. A hundred mil was still used within a month, plus more. It's had that buildup of moisture late November, late December, and then January. Individual sensors reflect more detail but essentially, a summary from that graph there. Then what I've also looked to do is grab a data set from another localised network. Shout-out to the Riverine Plains, they've got the site here at Tungamah, and it's pretty amazing how it pretty much mirrors what was happening at Youanmite, so not too far away. That's the response to the early October rain. It was all used within a month, and then we've got that moisture buildup.

It's looking what it was, winter last year, quite wet. It's back up to that position again. In summary, there's lots of public networks out there, so that's just giving some overview and some guidance on soil moisture. Ideally, that informed decision-making if you go to make it, that's from monitoring a point on your own farm. The current moisture status is a combination of what was left over from last year's crop, the impacts of summer rainfall we control if that was applied and your soil type. There's definitely sites out there that have received their growing season rainfall in the space of seven weeks. That's, that November rain to mid-January. Probably what we need here is some more finer gradients.

The rainfall zones are actually too large from 100 to 200. There's got to be a vast difference in terms of infiltration of what was happening here in the Millewa, which might be nearing a hundred mil. After here, it may be near 200 mil, so there's a hundred mil potentially different there, which is going to have a vast difference with infiltration. Anything within this zone, it's above 200 mil. I would expect that those conditions are pretty wet down at depth. I've got all those data sources there. I'll just leave it there knowing where we are with time and happy to take questions or direct them to Dale. The dashboard also does have a subscription system as well. If you're looking to get those monthly updates of how I'm interpreting conditions, click on the subscribe button within the dashboard and just enter your details.

Heather Field:

Fantastic. Thanks, Dale. I've popped a few of those links into the chat as we've been going to the newsletters for both the break and the moisture monitoring and the dashboard, and we'll make sure that these links are available in the recording when that is sent out as well. Just conscious of time. We do have a couple of questions that have come in through the chat. Our first one for Dale Grey is about just a bit of commentary around the predicted rainfall for southeast of Victoria.

Dale Grey:

All right, Heather. Well, we talked a fair bit about the southwest, but the reality is there's just no signal in any of the models at the moment for the southeast, so it's nothing away from that neutral forecast, which isn't nothing. I think there are three or four models which have a drier trend for the southeast and one that's got a wetter trend for Far East Gippsland. I think it's interesting the way that pressure pattern is set up that at the moment that is set up to hurt the southwest more than the southeast. The southeast could still manage to get some connection if the right system comes through, and we've been seeing that.

If that pressure pattern moves further eastwards and starts to actually ingress over Victoria, well, then we might start seeing some influence on Gippsland as well. At the moment, a few snips of drier one for wetter, but most of them sitting on the fence, which is normal for this time of the year. I think it's really a question of what that high-pressure pattern gets up to. If you start to see that high-pressure pattern start to move over Victoria and sitting over the state, that would not be a good pattern to be looking at.

Heather Field:

Thanks, Dale. Back to the southwest, just interested, Karen has got a question around that are you able to indicate any previous years where we might've experienced a similar setup and what we are looking at for this year? Have you seen something similar in previous years?

Dale Grey:

Look, it would be the first time that Western Victoria as a whole has been a bit later coming into the action than much of the Mallee and the central districts have. We've seen a little bit over the last few years where basically the West Wimmera has started later. It hasn't really mattered in the end with the season they've ended up. I think if we looked historically, Heather, we would see plenty of years where the southwest hasn't broken until May. That wouldn't be historically unusual. Certainly, undesirable, but not unusual. In answering that question exactly, no, I don't have any exact... I can't think of any analogue years. My memory is not good enough to do that, really. I don't have any knowledge of years recently where we've seen that high pressure.

There's nothing ocean-ally to the north of us that's really causing that issue. It's just the pressure positioning, which is, as I said, it's very much an autumn thing. We see increasing pressure of that subtropical ridge over the last 30 years or more. In autumn, that can hurt us. We've been a bit sheltered from that in the last few years with some pretty good starts and the rain we had in some parts of the state in early April was a great start as well. Just that sort of the old-fashioned general rain where the whole state is away, I just don't see that very often anymore.

Heather Field:

Thanks. We've probably got time for the last question, which is how often have we seen La Nina and a positive IOD combined?

Dale Grey:

Oh, gee, that's a good question. Well, if we go looking through the historic record, it's very rare. Now, I won't say there are no combinations. 2007 and 2008 were two years, we had weak La Ninas and weak positive IODs in one of them. I think 2008 was a much stronger one, but '07 was a weaker one. It's strange that it was two years in a row. If you go back looking in the historical record back to 1890, there isn't an example of that, that's really obvious. It's just a really rare combination and it's going to be interesting to see how that plays out. Of course, if we do remember '07 and '08, well, those years were generally drier. That was right in the middle of the millennium drought where a sniff of positive IOD over winter was trumping any action from a La Nina up in the Pacific Ocean. It's impossible to tell how that will play out except that just that combination is not very common at all.

Heather Field:

Thank you. I think that comes to the end of our questions and we have got some thanks in the chat there and a few people keen on those links from Dale Boyd. I'll make sure that those will be included in the recording, which should come out in the next couple of days, and feel free to circulate that to others that weren't able to join today. With time being at two minutes past, I will close it out, and thank both, our two Dales, for some great insights and your presentations on the autumn season ahead. Also, I'd like to just thank everyone for joining. We did have around 100 online today, so a fair bit of interest in hearing from you both, which is terrific.

Dale Grey:

I think we went through the conditions to make people interested about rainfall.

Heather Field:

That's very true. All right, well, thank you both and thanks everyone for joining. Please, as you exit out, just fill in that short survey. It'll only take you about 30 seconds to complete. Thanks, everyone. Thanks Dale. Thanks Dale.

Dale Boyd:

Thank you, Heather

Dale Grey:

Thank you, Heather, for driving at the back end and making it work well.

Heather Field:

No worries at all.

Dale Grey:

Well, yeah, I hope we can get some rain soon and we can have a great year, which certainly be possible if it rained.

Heather Field:

Absolutely. All right, thanks everyone. Have a great afternoon.