Heather Field:

Okay, we'll kick off. Welcome everyone to today's webinar, which is on, "Supporting farmers to measure and manage their emissions: A Wimmera broadacre case study." 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. So before our presenters begin, just a few housekeeping items. This webinar is being recorded and will be made available after today. Everyone's muted just to stop background noise. So if you do have a question, please use the chat function, which is currently explained on your screen and we'll make some time at the end of our presentation for questions. There will be a quick survey following the webinar and it only takes a minute to complete and we greatly appreciate your assistance in completing that.

So 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. And I'm tuning in from Ballarat, the lands of the Wadawurrung people and I'd like to acknowledge all the lands on which everyone is tuning in from today. So I'm pleased to welcome our presenters, Pru Cook, Craig Hurley, and Ash Brooks. So today Craig and Ash will speak on their project researching the application of carbon calculator tools and approaches to estimate the greenhouse gas emissions from three farms in the Wimmera region. And then Pru will follow by talking about the roadmap to net zero emissions Grampians agriculture project, which has developed an extension and adoption framework to identify ways to support Wimmera farmers in measuring and managing their emissions.

So just a bit about our presenters. Craig is a Federation University business management lecturer and researcher and has a wealth of experience in the development and delivery of effective sustainable development and responsible business education and research programs. And his research interest center around bioenergy and agribusiness applications for organic waste to energy technologies, low carbon farming and the embedding of sustainability principles and sustainable development goals and business education curricula.

And Ash is an agricultural communication and project management consultant and grower based in Dimboola and is passionate about the grains industry, regional Victoria and supporting a sustainable and profitable farming future for generations to come. And our third presenter today, Pru, is the director of Nine Creeks Consulting, which is an agricultural extension business based in the Wimmera focusing on pinpointing and addressing farmer motivation for change.

So we've had some good interest in today's webinar now, which is terrific. So if you do have a question, please pop them in the chat and we'll get to those following our presentations today. So with those introductions, I'm going to hand over to Craig now who's going to kick us off. Thanks Craig.

Craig Hurley:

Okay, thank you Heather. I'm just trying to advance my slide. There we go. Look, thank you Heather and thanks everyone for your interest in these research projects and for your interest in this really interesting and important space. What Ash and I will be presenting on is a project that we have undertaken over the last couple of years working with a couple of farms in the Wimmera region to use carbon calculator tools to estimate the carbon emissions from those farming activities.

So yeah, just the overview of what we are going to be tackling today. We'll be doing it in two parts. So the first part we'll just look at the background around carbon emissions and the use of carbon calculators and then we'll look at the results that have come out and the key lessons that have come out of the research that we have conducted and then we will hand over to Pru.

Look, the Wimmera broadacre farming net zero emissions project was a collaborative project that was... Look, I really do need to acknowledge the leadership that was shown by Chris Samus and the Wimmera Development Association. It was really Chris's patience and persistence that has really pulled this project together and it's been a real pleasure to work with everyone who's been involved in this project. So in particular, I would like to acknowledge Ash from a Agticulate and the three farmers that have worked with us to provide their data that we have used in our research. I would also like to acknowledge that we have received funding from the Commonwealth government through the National Land Care program and its Small Farms Small Grants funding and also some additional funding that has been provided from the Wimmera Development Association. Without that funding, this research wouldn't have happened. And obviously this project is also aligned with Pru's research into the Roadmap to Zero Grampians in Agriculture Project. So these projects have been conducted in parallel, if you like.

So focusing on the Wimmera Broadacre Net Zero Emissions Project. This was really about the use of carbon calculated tools to identify carbon emissions from farms in the Wimmera and how they might be able to be used to identify opportunities for Wimmera farmers to be able to, I guess, identify their emissions and then identify strategies that they might be able to apply to reduce their greenhouse emissions.

The main activities that we have undertaken was the collection of data or data relevant to carbon emissions from our three farms. And that data was from three or four years. So I think it was really from 2018, '19 '20, and we might have had one from '21 as well. That was originally from three Wimmera farms where we've actually we're in the middle of collecting data and doing some analysis on a fourth farm as we speak.

We then put that data through... Well, we've used five tools to date, but we've really focused on three main carbon calculator tools. I'll talk more about those in a second. Something that I won't be talking about today is that we've also done some scenario analysis. So we've run some scenarios on strategies and approaches that farms can use to get to net zero, and we've also done some economic modeling for the region on the impact regional economies of agriculture going to net zero. I won't talk any more about that, but I would like to acknowledge the work that's been done by my colleagues, Dr. Paul McFee and associate professor Abdel Halabi who have been doing that economic modeling as part of the project. But I'm going to focus on the carbon accounting side of the project for the rest of the presentation today.

So just by way of a background, in Australia we've got a couple of targets around greenhouse gas emission reductions. So we've got a commitment to reduce our greenhouse gas emissions by 26& to 28% below 2005 levels by 2030. Looking longer term, we've also got a target to be at net zero emissions by 2050. So there are our government commitments. But throughout our society and our economy, we've got a range of other organizations have also made similar commitments to net zero. So the Grampians New Energy Taskforce that represents most of the councils in the Grampians region has got a commitment to net zero by 2050.

Some of the agriculture peak bodies, the NFF and MLA have targets to hit net zero by 2050 or earlier. Half of our local councils have got net zero targets. Federation University, we've got a target to be at net zero by 2033. And, look, roughly a quarter of our ASX200 companies have commitments to achieve net zero by 2050 or earlier.

When we're talking about our greenhouse gas emissions, this is what we're talking about. Now, my apologies if this slide is a little bit difficult to read. This slide is an oldie but a goodie. It's about 20 years old this slide. But if we look at the right hand side of the schematic, you can see we've got our main greenhouse gases. So we've got carbon dioxide at 77%. Then we've got our methane and nitrous oxide. We've also got some other gases that are also greenhouse gases that we are looking to reduce emissions of. But the main ones that we are going to be focusing on, carbon dioxide, methane and nitrous oxide.

Not all greenhouse gases are equal. And so some of these gases are more potent than others when it comes to their efficiency or potency as greenhouse gases. Carbon dioxide we say is because it's the most voluminous, we talk about carbon dioxide and carbon dioxide equivalence. So methane, for example, is 25 to 30 times more potent a greenhouse gas than carbon dioxide. Nitrous oxide is 250 to 300 times more potent a greenhouse gas than carbon dioxide. And when we'd start talking about the others, we're talking about hundreds and thousands of times more potent as greenhouse gases.

If we move then towards the left of this schematic, these are the types of activities in our community and in our economy that are generating these greenhouse gases. And then if we move across to the left, we are looking at the sectors that these greenhouse gases originate from. Clearly today we are here to talk about the purple band down towards the bottom of the screen where we're talking about agriculture. Now this slide 20 years ago was talking about agriculture worldwide representing roughly 13.5% of our global greenhouse gas emissions. And that's roughly where we're at in Australia. Over the last 20 years, agriculture's contribution to our greenhouse gas emissions has hovered around that 12, 13, 14, 15 range. And so it's reasonably representative of where we're at today.

I guess the take home message around our greenhouse reducing greenhouse gases is that every one of these areas needs to be doing its bit to reduce greenhouse gas emissions. We can't just leave it for the transportation sector or the energy sector to reduce their emissions. Every sector, every part of our economy and our community also needs to be active in this space and hence why agriculture has got so commitments to reduce greenhouse gas emissions.

When it comes to measuring and reporting on greenhouse gas emissions, everything that we do in Australia needs to comply with the National Greenhouse Energy Reporting Scheme, also known as NGERS. This has been around since 2007. And so all of the methodologies, the guidelines, the protocols, these all align with NGERS and NGERS actually that responds to the IPCC guidelines and protocols around the measurement and reporting of greenhouse gas emissions.

Now at the moment, only Australia's largest emitters of greenhouse gases are actually required or obligated to report on their greenhouse gas emissions. So we're talking about our steel manufacturers, our aluminum manufacturers, our fossil fuels energy generators. So our coal fired power stations, our gas power stations. These are the ones that are obligated to report on their greenhouse gas emissions. So a lot of other sectors in the Australian economy are currently not required to report on their emissions.

When we talk about our emissions, we're really talking about, or we divide our emissions up into three different categories or scopes. So we have scope one emissions. These are the direct emissions that come from an organization or a factory or a farm. So scope one emissions are the ones that actually happen on your property, on your farm as a direct result of the activities that you are doing in going about your business. We also have scope two. Scope two is largely looking at electricity but also some other forms of energy a generation, but we're mainly talking about electricity. But then we've got scope three. Scope three is perhaps the more contentious of the scopes because that includes everything in our supply chains, upstream and downstream. So these are the greenhouse gas emissions that are embedded in the products and services that we use in our businesses. And when we're looking downstream, we are looking at the downstream impacts of our products. So bear that in mind because when we do our calculations, we do categorize our emissions into these three scopes.

Okay. So when we measure and report on our carbon emissions, we use carbon calculators as tools to measure our carbon emissions. So carbon calculators are just computer programs that we use to calculate up the approximate amount of carbon dioxide produced by a business or an organization. Typically these carbon calculators are Excel spreadsheets or online websites where you input data into these tools. The factors and the calculations that are behind these tools will then provide a result of a carbon footprint, which is presented as tons of CO2 equivalent. So we talk mainly about carbon, but the CO2 equivalent also includes our methane and our nitrous oxide and other greenhouse gases.

When I think about the different components of measuring carbon, there's three really important areas. The first is the design of the carbon calculator tool. There's a range of different tools and we'll talk about those later. But there's a lot of work and research that goes into the development of these tools and that's not my area of expertise. Then we've got the data collection side of it. So that's a whole other area around working with, in our case, we're all working with farmers to gather the right data that we need to put into the tools. And then there has been the results analysis component of it where we put the data into the carbon calculator tools and we interpret the results that come out of those results.

For our project, we originally wanted to use five or six different tools. Now they included the engine. So the government's threshold calculator, we didn't use that so much. The main ones that we really used were the AFI, so the Australian Farm Institute's FarmGas tool, which is an online tool. I also wanted to use one from overseas, so I used another online tool, the Farm Carbon Calculator. And then we also used the University of Melbourne's Greenhouse Accounting Framework that these tools are developed by the Primary Industry's Climate Challenges Centre, professor Richard Eckhart. And many of you might have heard of Richard and the work that comes out of that center. We used a range of those different tools. We were really hoping that before the end of our project that we would have access to a new tool that is being developed by CSIRO. At the moment, we don't have access to that tool and so unfortunately we haven't been able to compare our results when it comes to yet this new FarmPrint tool.

Okay, so they're the carbon calculators that we used on the data collection side. I'm now going to hand over to Ash who collected all of the data from our three farms in the Wimmera. I'll let Ash talk about some of the experiences and learnings that we got out of that part of the process.

Ash Brooks:

Great. Good afternoon everybody. And yeah, thanks for the opportunity to come and chat with you all today. So just to contextualize where my part of the project was, we might go to the next slide, Craig. So there was four parts within our project, I suppose. So Craig's spoken about, I suppose, the role of data, the calculators that were involved, but just sort I'd step you through how we've gone about our Wimmera based project.

So to choose the growers that were involved, what we did is we thought about, I suppose, the different farming systems in the Wimmera and selected four growers that had completely different systems so that we could establish and understand relative baselines for different business types. To collect the data. As Craig mentioned, we started with the intention of using five to six calculators, but unfortunately we probably pared that back and ended up using three. But nonetheless, we've collected the data so that if any stage we want to go back and you put that data into a new calculator that does develop, we've certainly got that opportunity. So developing a broad template that enabled us to, I suppose, capture all the data that we needed. So we only had to work with growers once to get that so that we can use that for future purposes if we so choose.

That was pretty much where I started and stopped with the project. I then handed the data over to Craig and from that point he certainly calculated, done a great job putting that into various calculators. And then we've had the opportunity to certainly have some great conversations around extending that data. The learns that we've had along the process, the baselines, the approximate baselines, that we've established or Craig's established from using that data within the calculators and highlighting some of the, I suppose, key areas and key drivers which are driving emissions within the project or within the individual growers farms.

We could go to the next one. So in terms of the collection template, as I mentioned, we just created an Excel spreadsheet that was suitable to capture data for a number of models. Each of the models, as Craig will probably talk about in the next few slides, is that each of them require the data in slightly different forms and different have different requirements. So our input spreadsheet was certainly very broad, but was enabled us to get the data that we needed.

From a data accuracy point of view, like anything quality in equals quality out. A number of these models are certainly improving over time and new versions are always coming out as accuracy increases with obviously the algorithms within those models. Certainly out of my depth, but we are seeing different versions all the time. But I suppose what our view was and certainly our objective with the data collection piece was that accuracy's really going to help and assist any data output variability. So the more accurate we could be with the data collection will certainly help with the output. So that's certainly nothing new.

We also identified that there's some on-farm practices that are really known to have some influence or have some significant impacts on the figures, particularly burning. So really highlighting the importance of that data accuracy. One of the challenges that we did face with data accuracy is that in some instances that assumptions are required, the data isn't always available for certain areas within some of these calculators. But having good discussions with the growers, their local understanding and the historical knowledge was certainly really beneficial in that space and we're able to come up with some fairly good assumptions, which in every case have certainly been documented.

We could go to the next one. So in terms of where is the data I having a look at who's online today, certainly know that many of you're familiar where all of the data is housed. Depending on the farm, we had a look in different platforms, notebooks, a range of satellite imagery as well. But I suppose largely the emissions data that we did collect fell into four categories. So we pulled data from financial and accounting systems, MYOB, Xero, Agrimaster which you're all familiar with. We used satellite imagery as well. The satellite imagery was particularly useful in terms of understanding the vegetation types on farms. So a lot of growers had very good explanations of what species and things like that were present within their unarable farmland. But what was difficult and what's a really important thing to include within the models, and Craig will allude to this a little bit further on, is understanding the density of the vegetation. So having a look at the satellite imagery has been really worthwhile and a great overlay to the grower commentary and understanding of on farm vegetation there.

Equipment company data. So John Deere, my operations, understanding fuel consumption per hectare was great data to be pulling out of some of those platforms as is Case, Trimble, New Holland, all of those. But I suppose the large bulk of the data really came from the crop and the stock management programs. Some people had paper-based Excel-based systems, which were great. Others are using Agriweb, Maiagrazing, Agworld Back Paddock. So I suppose what we really found there is good records certainly sped up the process and saved a lot of time. So yeah, record keeping is certainly paramount in this process as well. But key point here is that there's data for input into a lot of these models is located in a lot of different areas and it is time consuming, particularly when you're doing it for the first time. But like anything, it certainly gets quicker as you go along.

Next one. So in terms of some of the data challenges, I personally found and learned a lot going through the process, which was really good. But I suppose my key takeaway from all of the data collection was that accounting, farm input and carbon data, they're all slightly different. So the data that we collect for farming purposes and accounting purposes is different to our input and our output purposes. So generally the data that we needed for the carbon calculators is absolutely there in some shape or form within grower records, but sometimes we've probably just got to tweak that and integrate some assumptions to be able to get it into the right form of the carbon calculators.

I suppose a couple of practical examples that I came across was from a cropping enterprise point of view was the percentage of ground cover in stubbles grazed over summer. So say, in February, a lot of growers didn't have the percentage of ground cover, or sorry, a documented percentage of ground cover in stubbles following a summer grazing. But most people could say, "Oh, I think that ground cover's about 50%, 60% or something like that." So they're the types of assumptions that we had to make.

Similarly, I suppose electrical use or electricity use, everybody just pays their power bills. So we don't typically tend to work out how many kilowatts of energy we've used in any 12 month period, let alone I suppose, across each of the different enterprises in the farm business. So again, overlaying some assumptions around proportionality of cropping vessels, livestock and things like that within a business to split electricity use with some of the additional assumptions that we also had to do or had to make, should I say.

The other one was vegetation growth and age. As I mentioned earlier, a lot of growers really obviously understand the type of vegetation they have got on farm, whether it's a Mallee scrub versus dense below plantation and things like that. But I suppose the more we can really hone in on the vegetation growth and understand the age, age is a little bit challenging when you're talking below plantations of in excess of 400 years old, but it's the density of those plantations and Craig can talk about that more. So that's probably something the more data you can get on your vegetation, understand your shelter belts, what are the species, what's the density of those? Knowing the ages certainly really helps.

The other thing that I really found through collecting the data was that cropping was possibly a little bit easier to collect. I think it's because you've got great platforms which allow you to record the inputs, the outputs are very clear in terms of the yield and grain sales and technology certainly plays a large part of that. And obviously having a lot of the equipment software which fuel use and things like that are recorded.

I found livestock that a little bit more challenging just because of the round robin of obviously maiden use in, wieners out, selling of cold use and things like that. So I suppose it's a little bit more time consuming and a little bit more of a game of chess with the livestock component just to manage those numbers and working out, I suppose, average plot numbers across the year. But that's not saying that it's not achievable because it absolutely is, but it probably just takes that little bit more time to drill into those numbers. And then again, going back and fact checking those with the growers and making sure that they're comfortable with the approximate live weight gains that, yeah, we've recorded across the year.

So yeah, all in all, look, I think it's a great process. I suppose coming into this, I wore two hats. Obviously working with Wimmera Development Association to collect the data, found it very interesting on that front and a lot of learns. But also as a grower, I think there's a lot of opportunities here by just understanding what your baseline emissions on farm are. And whilst some of these numbers are not going to be a hundred percent accurate, which Craig will go into in future slides, they'll give a really good idea on sort of benchmark numbers and certainly provide food for thought for future farm planning and consideration. So that's pretty much all I've got for you all today. So I'll hand back to Craig and he can present some of the results that we found from the growers that we worked with. So thank you.

Craig Hurley:

Thanks Ash. Yeah, thanks for that summary, I guess, on some of the complexities of gathering the data, and it was certainly great from our research team's perspective of having somebody like Ash who had such a good understanding of the industry and these complexities as both working in the industry and as a grower herself.

What I'm now going to move on to is we're going to have a look at some of the examples. We're just going to have a look at two of our farms. The first of that I want to look at is Farm D, and we're looking at data that on the season 2019. So this farm is in the Yarriambiack Shire, we're looking at just under 1900 hectares, of which a bit over 1600 hectares are cropped. Got 660 sheep and around 130 hectares of sparse woody or forest vegetation on that farm. So yeah, most of this farm activity was around cropping.

Now this is one of the tools that we used. As you can see, this is an Excel spreadsheet, and this is just looking at one part of the data input component. Now, for each of these farms, I had to do two or three or four of these for each depending on the types of activities, but we used multiple tools to cover each farm. But as you can see, we're putting in data around the type of crop, the area, the yield, we're looking at what sort of inputs have been put in terms of chemical and fertilizer. I must confess that it was only about half an hour ago. I did have a bit of a freak out when I looked at this and thought, hang on, I've got 10 in this box.

If you look at the box down line 16 there, that line there is actually fraction of the annual production of crop that was burned. I should mention that none of the farms that we looked at burned any of their stubble. I just did that for my own curiosity. And if we were talking about, that's actually 10 hectares, but 10 hectares out of that barley crop, if 10 hectares was burnt, that would automatically become the farm's biggest contributor to its greenhouse gas emissions. So burning any part of your crop, it then becomes the main source of greenhouse gas emissions. But yeah, so I had to actually go back and check my calculators to make sure that I hadn't actually made a mistake. No, I'd actually just done that for my own curiosity. But this is what they look like. And you can see the herbicide pesticide down there in the bottom at the bottom of the screen. Yeah, that's all measured in kilograms.

Okay. Once again, look, I do realize that it's difficult to read exactly what's going on with each of these, I'm just showing you these to show you what they actually look like. So this is from the Primary Industries Climate Challenges Centre at Melbourne University. This is the hotspot analysis that gives you a summary. I've actually taken it one step further to collate the data from all of these tools into one summary. And this is what it looks like for Farm D.

Now if you look at the charts on the right hand side of the screen, you can see we've broken those emissions up into scope one, two... Oh, I haven't got two there because that wasn't really that sub substantial. But scope one. So the on-farm direct emissions, you can see there that most of those are around nitrous oxide and methane that are associated with the cropping residues, leeching and runoff and fertilizer use. You'll notice CH4 methane enteric. That's talking about enteric emissions from the livestock. We've also got some emissions from fuel use. But yeah, the really big one that you can see towards top of the screen is the embedded scope three emissions that come from the herbicide and pesticide use. So the use of chemical is by far, for this particular farm, is by far the biggest contributor to this farm's greenhouse gas emissions.

Look, I do apologize at the top of the screen you can see the green CO2 sequestration in trees. That's a really small component that only comes out at 33 tons of this farm's emissions have been offset in trees and that was largely because the trees on this farm were very old. So most of the benefit from trees comes when they are growing. So younger trees, particularly between sort of 15 and 30 years of age is when they are doing most of their growing. And when they are growing, that is when they are sequestering or storing carbon from the atmosphere. With these trees, I think from memory, these might have been 150 or 200 year old bull oaks that were incredibly slow growing. And so unfortunately for this farmer, there wasn't a whole lot of carbon benefit from these trees. But we need to consider the biodiversity benefit or value that is provided with these trees.

Let's look at our next farm is a slightly different farm. This is a bigger farm. Looking at over 10,000 hectares this farm was on a couple of locations in the Hindmarsh Shire. So roughly 3,000 hectares of this farm was cropped, but there was almost 20,000 sheep on this property. And also significantly, 860 hectares of trees as well, either sparse woody or forest. So quite a different farm. And as you can see, got quite a different greenhouse gas emissions profile.

As you can see in the scope one emissions, the enteric emissions from livestock, really substantial and that's by far the biggest contributor to this farm's emissions profile. If you look at the rest, we've got the familiar factors such as the cropping residues, the nitrous oxide from fertilizer use and from chemical use and the fuel use. They're still significant factors as well.

What you will notice though, is right at the top of the screen you'll see that the carbon sequestered in trees is really quite substantial. Almost offsets the enteric emissions. Not quite. But that's largely due to having 860 hectares of trees. And also those trees weren't seen as being quite as old as the trees from the other example.

But I guess one of the things that I probably should mention though is that those numbers are big numbers. Looking at gross farm emissions of nearly 7,000 tons of greenhouse gas emissions. They're big numbers if we consider that the average person is responsible for somewhere between five and 10 tons emissions annually. So the emissions from this farm are the equivalent of the emissions that you might see from a small town. So these are significant numbers.

And so, look, just to summarize. Look, I think just from the slides that we've just looked at, the main contributors to greenhouse gas emissions from our Wimmera farms were from the enteric emissions from livestock fertilizer application, chemical application, the crop residues from the broadacre cropping activities and the fuel use. So if we are looking at reducing on farm emissions, we're really looking at targeting those activities. I'm not going to go into this in any detail, but there are really things that are happening in this space. So obviously protecting existing vegetation or planting new trees will go some way to offset farm emissions. Also looking at efficient nitrogen fertilizer management. So the four Rs of the right product, the right time, the right rate, and so on.

Efficient chemical application. And this is where I think there's some opportunities for technology to play our role. Particularly if we can look at improving the outcomes that come with green on green or green on brown chemical application that mean that we can really make some step change in terms of reducing the amount of chemical that we need to be applying to our crops. And look, the final one is that some of the work that's being done by MLA and CSIRO around the development of feed supplements for our livestock. These things aren't available at the moment, but we're hoping that in the next 10 years or so, some of these supplements are going to make a real difference in this space.

Just really quickly, I'll rattle through some of the key learnings that we've come out of this. There are some differences between Australian farming and European farming that are still contested. So there is still development in this space. Not all carbon calculators are equal. And look, I will point to a real tradeoff between the accuracy of a tool and its ease of use. Look, we've probably all had experiences in going online and doing some of the personal carbon calculator tools. These are things that will take you five or 10 minutes to do and give you a bit of a snapshot or an estimate of your greenhouse gas emissions. But the more complex and the more detailed the tool, the more accurate it might be. But you really do need to weigh up and balance ease of use with the accuracy.

These tools are still being developed and certainly with the GAF, I think we went through three or four iterations of the tool. So these are still being developed. And obviously FarmPrint, we're waiting for FarmPrint with bated breath. Ash has already pointed to the issue of quality in, quality out or conversely garbage in, garbage out. So the better and, I guess, more detailed the data, the closer we're going to be having an accurate result.

These tools are actually loaded with assumptions though. And particularly when it comes to, Ash has referred to the sequestration in trees. This is one of the things that I'm keen to do some development in is, I guess, making sure that we've got some accurate data when it comes to trees. And what I mean by that is that with the Australian Farm Institute FarmGas tool, that one actually, it wanted to know how many trees. So it wanted to figure how many trees have you got. Not how many hectares, how many trees have you got. How old are those trees? What species are they? And how many tons of CO2 is that each tree taking out of the atmosphere. Now for a lot of us, we don't have that data and it actually took me a long time to actually find that data on online. Whereas other tools, they just want to know how many hectares of trees have you got. So lots of assumptions in those tools.

I mentioned about considering the results holistically. And what I mean by that is that, yeah, look, don't just be focusing purely on carbon. It needs to be weighed up with a whole range of other economic, social and environmental factors. I've already spoken about the burning of stubble. And look, is there a role for carbon calculators in helping farmers to reduce their greenhouse gas emissions? Look, I would say absolutely yes. But yeah, and I'll now hand over to Pru who will talk a little bit more about how farmers are engaging with these sorts of tools and issues. Thank you Pru. I'm just going to stop sharing my screen.

Pru Cook:

And I'll start sharing mine.

Craig Hurley:

Awesome, thank you.

Pru Cook:

All right. Hello everybody. Now I'm going to give you a very quick skim over a two year project that finished in October last year. I want to acknowledge that the funding came from AgriFutures and again, want to support the project team and Wimmera Development Association in their leadership.

Now, what we were wanting to do in this project was there's the perception that a lot of stuff in the emissions space is being done to farmers and not done with them. So what we wanted to do was understand what do farmers need in this space? How can we best help? So we started by understanding where farmers currently are in the Wimmera in terms of their intent and awareness. And then we also wanted to look at where industry expected farmers to be. And we wanted to then map whether there were any areas of misalignment between where farmers are currently at and where industry's expecting them to be.

From that, we were then able to identify where Wimmera farmers are on this adoption spectrum, which you can see running along the bottom of your screen, which starts at awareness, moves through to adoption, ideally ends up in advocacy. And then we produce an extension and adoption framework, which housed all the recommendations and the results from our findings. That final report has not quite yet been uploaded on the AgriFutures website, but should be available there shortly.

A quick skim over the methodology and the results. We always start with the farmer and so we went and did 27 interviews with Wimmera broadacre farmers. They were semi-structured, in-depth interviews. We captured demographics, information sources where they get their extension and information and advice from. What they do when they're considering a practice change, any change. Their thoughts and feelings on decision support tools. Their awareness of carbon calculators, which was very low. Only about a third of interviewees knew what a carbon calculator was and their intent to use it was also pretty low. But what was interesting that if they were to use one, 75% indicated that they'd probably prefer to use it themselves instead of using a service provider, which is interesting given what Ash has presented about the requirements from the data collection.

We then finished up by asking their awareness of emissions reduction practices. And again, awareness here was pretty low. When they were offering responses, it was kind of asking a question of the interviewer and what tended to come through the most were things like using renewable energy such as solar panels or improving efficiencies in machinery. Which kind of feeds into the general media that we get around emissions reduction, which is pictures of power plants and lots and lots of cars. So there wasn't a huge amount of awareness that things like soils, residues, fertilizer and agrochemicals have in terms of their emissions, and to a lesser extent, livestock.

We moved from the farmer interviews into farmer influencer interviews because the majority of farmers we interviewed said that agronomists, farm business consultants and grain marketers were really important to them when considering a practice change. Now all of these influencers indicated that none of their clients had ever come to them asking for advice or support in measuring and/or managing their emissions. When asked where they thought this responsibility would lie, everyone sort of agreed it was probably with the Farm Business Advisory Services. And what was really interesting here was an anecdote from a grain marketer who said, "Look, when there is a clear value proposition or it's clear market driver, in this sense, adoption can happen rapidly." And they used the example of sustainability declarations for EU canola markets as an example there.

The third activity was subject matter expert workshops where we worked with service providers, policy developers, and people who are working on designing products and services for farmers in the emissions measurement and reduction space. And we took them through a customer journey mapping exercise to see the likelihood of success of farmers wading in this space. And unfortunately, the majority of people participating in this workshops didn't really see farmers getting much past the awareness stage on that adoption spectrum given the current barriers we have in place. And I'll touch base on those barriers in the next slide.

Through activities one to three, it became very clear that the influence of the supply chain was going to play a very big role in helping farmers to manage particularly those scope three emissions that Craig's just touched on. So we then went and we spoke to representatives from the fertilizer, agrichemical and finance industries to understand their intentions of where they're expecting farmers to get to and what they're planning to do to support farmers. And then I've finished up by interviewing the farmers that Craig and Ash had worked within in their project because they'd been through an emissions management process and I wanted to understand what, if anything, they were going to do differently as a consequence of understanding their emissions better.

The first farmer that Craig presented said, "Look, for the most part, given that agrichemicals and fertilizer were the largest source of his emissions," he's said, "I'm going to be pretty reliant on the supply chain to help me out there." And for the other farmer, he said, "Look, either reducing my livestock or re-vegetation are going to be the areas that I would focus on." But he's not going to do anything now, he's just said it was a very interesting process to go through and he knows the leaders that he can pull in the future, should a clear value proposition, a carrot or a stick come through that says he needs to reduce his emissions.

So the main barriers that Wimmera broadacre farmers are going to find when they wade into this space is that first there's no clear value proposition. Yes, there are targets, but in terms of an individual farm business in the Wimmera, there is either a carrot or a stick. So a market incentive or some level of compliance that I need to do now. It's not there. So getting onto that adoption spectrum in the first place is a pretty low priority for most farmers. When we get to the carbon calculators, there's a lot of them and they offer different results. GrainGrowers Limited and the Continuum Group put out a fantastic fact sheet a couple of years ago, which compared a number of different carbon calculators in two farm case studies in New South Wales and WA. Go and have a look at that resource because the results were quite varied.

When a farmer comes to the first stage of that adoption spectrum, that awareness stage, there is a lot of information, it's information overload. There's conflicting sources, it's coming from everywhere. It's quite heavily geared towards carbon marketing and it's a very confusing space for farmers. But should a farmer move further down that adoption spectrum and get towards the space they're actually wanting to implement some practice change, then there's a lack of locally based R&D evidence that says to a farmer, if I'm going to implement this practice on my farm, this is the impact it will have on my profitability and this is the impact that it's going to have on emissions. So information overload at the start, which moves to information deficit the further you get down that adoption spectrum.

The last point, which I've popped up there, came through in enough interviews for it to be an interesting point and doesn't necessarily just relate to emissions reduction but any practice change more generally, is that a lot of younger farmers said, "Look, there's a lot of change we'd like to make on farm, but either we don't feel we can because we won't get agreeance elsewhere in the farm business, or we don't know that the farm is going to be ours in five, 10 years so we're reluctant to invest the resources to make those change." So a key thing in helping in this space is going to be improving succession planning in family farms and supporting family farms with intergenerational communication.

So moving on to the recommendations now. We've come up with four different pharma segments that can be targeted using different mechanisms to help move them along those adoption spectrum in relation to emissions estimation and/or reduction. And I'll go into each of these four in a little bit more detail.

So the first one is the environmentally focused segment, and we're going to be able to support these farmers to both estimate and manage their emissions. They're probably already part of the way they are doing it. So the adoption for this segment aligns with strong values associated with environmental stewardship that have a greater appetite for significant systems changes and they're going to be more willing to make profitability tradeoffs. But in the Wimmera Southern Mallee, they're a pretty small segment. I included ability to influence because when you remember the advocacy part at the very top of the adoption spectrum, that's really critical in terms of farmers learning from other farmers is so important. So these farmers will be able to influence those with similar values to them. But farmers outside those values will probably be lower influence.

The practices that we can target here, revegetation, pastures, soil amendments, cover cropping, reducing livestock. So potentially regenerative agriculture focus here and the adoption support methods that will work best for this segment. They're going to apply for grants, they're going to be willing to engage with government services and perhaps land care and discussion groups. When you're communicating with this segment you appeal to their values and environmental improvements and a strong visual component works here.

The next segment is market focused. Now this segment will be able to get them to potentially estimate their emissions, but they're not going to move into a management phase until there's a clear value proposition. So this is a segment that understands that what happens beyond the farm gate is going to impact their future profitability and they want to prepare for what's coming in the future. They're going to be more likely to explore carbon trading and they've got greater appetite and resources for transformational changes.

On the flip side, they're time poor, readily frustrated, and they don't deal with ambiguity well. So you don't get too many opportunities to engage with these farmers before barriers go up. Ability to influence is really high. These are the farmers that other people will look at and go, "If they're paying attention to this, it's something I need to be mindful of too." So a good segment to be targeting extension efforts at. Practices to target, retiring poor performing parts of paddocks, improving fertilizer efficiency. They're going to be more inclined and resourced to invest in ag tech, improving machinery and fuel efficiency and improved animal husbandry and management. The adoption support methods that will work here, grants. But what's going to be most important is this farm business advisory service. When you're communicating with this segment, research data and economic analysis is really important to help them with making decision making.

The next one is social license focused. And we had quite a few of these come through in the interviews is that these farmers believe that they're pretty low emitting or close to net zero using in their current practices. And they're like, "I just want the community to know that I care, I'm a good farmer, I care about the environment, I care about my community." But their expectation is that they want their representative bodies to be able to do that demonstrating for them. So their ability to influence is actually their main motivation is going to demonstrate their credentials to the non-ag community.

So we're probably not going to get this segment to measure or manage at this stage. There's a lot that needs to go in building awareness. And what would really work here is for benchmarking that starts showing, like Craig and Ash's work, this is what an emissions profile looks like in a Wimmera farm so that we can start building that awareness of where they might sit.

The last segment is basically anybody who doesn't fall in the last three. And what we're looking at here is we're potentially going to be able to get these farmers to adopt practices that have some emissions reduction benefits, but that's not going to be the motivator. And if you look at the practices that are listed here, CTF, VRT, improving agronomy, soil improvements, improved animal husbandry and management, this is all stuff that comes in with just good farm business management. So we'll be able to get people to adopt some of these practices for the productivity or profitability benefits and the emissions measurements probably won't be a consideration for a farmer, but may be beneficial to down the track if and when that clear value proposition is in space.

So agronomists are going to be really key here. Our existing extension programs will work. What needs to happen in the background here is we keep gathering that R&D that shows what those emission benefits are in the adoption of these practices. That is a very, very quick skim over of a two year project. Thank you very much. And we can hand back over to Heather for questions.

Heather Field:

Thanks Pru. Yeah, and thanks Craig and Ash, great presentations today, great projects that you've both been working on. We do have about five minutes for questions and we have had a couple come through in on the chat. Our first one, it's probably around the calculators. We've had a couple around the calculators and wanting to know which ones are free for growers to use and which ones perhaps need payment. So I know the Melbourne University ones are free for use, but if you put a comment on that, Craig.

Craig Hurley:

All of the tools that we used were freely available. So the AFI, look, all they required was registration. So yeah, as you said, the Melbourne University ones are available freely for download directly from their website. But the AFI and the one from the UK, they just required registration, free registration to get access to those tools.

Heather Field:

Thanks Craig. And we don't have an expected date for release of FarmPrint yet.

Craig Hurley:

I don't know.

Heather Field:

Yeah, no, I've looked into that one too, but yeah, haven't heard yet. So we'll just keep waiting for that one. We had a question around the proportion of the second case study, property B I think it was. What proportion was under trees? So it was 860 hectares, I think it was under trees. Do you know what proportion that was?

Craig Hurley:

Yeah, no. I think it was a bit over 10,000 hectares and, yeah, 860 were under trees. Yeah. When it came to the trees, we relied on the satellite data and so that's one area that I would like to see, I guess, some more exact data. Look, we had some general estimates, but just I guess to ensure that we were being consistent across the three farms we used the same methodology. I guess using the DAS, the digital... The DAS. What is it? Digital Agriculture Services reporting. And so we got reports done on each of those properties. And this was the data that we got from them was that was 860. That was what we went with. But as far as the use of those tools of that as a strategy, I think I'd be interested in other ways in which we can get some more exact data about the types of trees and the age of the trees, species and the carbon that they might be sequestering.

Heather Field:

Thanks Craig. And every property is different, so the amount of tree sequestration is going to vary dependent on that. Just another one with the calculators, and I'm just trying to find it. It was about the soil sequestration and whether the calculators have the ability to do that.

Craig Hurley:

The calculator... And this is getting outside of my area of expertise, but the soil, my understanding is that the soil sequestration was included in the residues, the cropping residues component. So depending on whether that or what proportion was fixed below the soil or whether it was... Yeah, that was part of the calculations built into the calculator as far as I understand.

Heather Field:

Thanks Craig. And we might jump to a question for Pru. So your farmer interviews were conducted in 2021. Do you think the findings would be the same if you did those interviews now?

Pru Cook:

Very good question. I think there'd be a small improvement in awareness, but probably not any more intent to adopt. If anyone wants to give me some funding, I'm happy to go back and find out. But look, I don't think there's been a huge movement in this space. There's was a lot of skepticism in my interviews. A lot of farmers said, "Hey look, I explored this 10 years ago when carbon farming was a big thing and nothing came of it. So I'm pretty wary of jumping back in again." So it'll sort of depend on which farmer segment they sit in. But for the most part, I think there will have been an uptick in awareness and maybe there's little bit more of a, "Oh, yep, something's coming down the line." But in terms of whether any of those, I would be very surprised if any of those farmers have done any emissions estimation or made any practice changes in the nearly two years since the interviews have occurred.

Heather Field:

Thanks Pru. Now I have just noted that we've just clicked over time, so I will pull up on the questions there because I'd like to try and finish on time, but I will have a bit of look through those questions and we'll see what we can respond to after today's webinar and get back to those that we haven't been able to get to. But yeah, with time ticking away, I just want to say big thank you to our presenters today, Craig, Ashn Pru for sharing those great projects with us and really great insights and some key learnings around that data collection. Input in and relates to the output. And also the segments that you were talking about, Pru. Yeah, it's very good bit of work there for our extension delivery.

So with that, I will close it out and I do just want to remind everyone, we do have a survey that will pop up on your screen when you do exit today, and we have recorded the webinar, so if you do want to go back and listen to some of that great information and have another look, I will be sharing that recording probably next week. So with that, I will close out the webinar and thank you everyone for participating today.

Craig Hurley:

Thanks everyone.

Heather Field:

Thank you.