

# Bayer AG

## Crop Science Summer Technology Showcase

### 1 August 2019

## Welcome

### **Oliver Maier, Head of Investor Relations, Bayer AG**

Good afternoon, everybody. I'd like to welcome you to our showcase here today and tomorrow. My name is Oliver Maier; I'm the Investor Relations team lead here today.

### **Laura Meyer, Senior Manager, Investor Relations, Bayer AG**

And I'm Laura Meyer, a different Meyer – M-e-y-e-r. I'm the American version here, and I'm also on the Bayer Investor Relations team, together with my colleagues. You'll see Ben Kampelman out back there waving, and Judith Nestmann. Our focus area in Investor Relations is on Crop Science, which is why we are here to host you today. If you need anything throughout the event, look for us; we are happy to help you.

### **Oliver Maier**

Thank you. We are very thrilled by what we have to share with you guys for the next two days. This is going to be a great build-upon what we've done at the capital markets day, back in December. The day here today in Chesterfield, and especially the day tomorrow in Jerseyville, is going to be a fantastic display of what we think is going to be the future and what's important for Crop Science. It's an extensive programme, where we try to cover all of the growth areas of Crop Science in the future.

We've received a tremendous amount of support from a lot of people across the combined organisation, and you see them all sitting in the back; they all have this shirt that I have. There's no way on earth that I could mention all the names back there, but let me sincerely thank all of you guys for all the tremendous amount of work and effort you put in there to make this event happen. I'm very proud of that, because this is a great example of integration at work. Thank you.

### **Laura Meyer**

We are not only excited to have you here at the showcase and share our technology with you, but we're happy to have you here in St. Louis – for a couple of reasons. I don't know who's here from Boston, but we're awfully proud of our St. Louis Blues Stanley Cup champions and, to commemorate the event, you all have some Blues caps, which also happen to have the DEKALB logo on the back. If you're from Boston, you can take two if you want, but we're happy to have you here.

Probably more importantly for this event, we're happy to have you at this site, because this is the global headquarters for research and development for our seeds and traits business, within Crop Science. We recently wrapped up a more than \$300 million investment in this site. You're sitting in part of it here today. We've added more than 36 new high-tech greenhouses – you'll see those this afternoon – 250 lab spaces, and we have over 1,300 employees at this site. Of course, a lot of scientists and PhDs working here, so very impressive location; we hope you enjoy it.

Let's take a look at what we're going to go over with you today, while we're at this site. We have a very full agenda for you for the next two days. We're going to actually open here today with some

keynote presentations on stage. Werner Baumann, our CEO, will share some comments with you. You'll also hear from Liam Condon, who's President of the Crop Science division, Bob Reiter, who leads R&D for Crop Science, and Mike Stern, who is our head of Digital Farming for Bayer Crop Science. Once they complete their presentations, they'll be available on stage for Q&A. Once we wrap up the Q&A, we'll finally get to a short break, then we'll come back here to the atrium. We're going to break into five different groups and we're going to go out and tour the facilities, so you can see each of these leading technology platforms first hand and with the people who deliver on those results, in these platforms.

We'll come back here; we'll have dinner and cocktails here, and we have a customer panel also for you, this evening. I'm pleased to share with you that those customers are with us here today. I'd like to acknowledge them, if they don't mind raising their hands. They're kind of around the back, but we have Cassio, Justin, Tap and Joe with us today, from Brazil and the US. Thank you guys for taking the time to be with us. We know you have very busy schedules and we appreciate it. That would wrap up day one.

Day two is not on here, but you're probably wondering, 'When do I get out in the field?' Tomorrow you're going to get out in the field. That's when we'll head over to Illinois to Jerseyville. You can see first hand how what starts here ends up in the field for customers, as a solution there. That will be the close of our event, by the time you get to day two.

### **Oliver Maier**

All the material, the presentations and the Q&A are being webcast today. All the material is available on our Investor Relations website, just to point that out. There are also some additional slides on the R&D pipeline in the appendix, where we've added some additional information that might be helpful for you, just to point this out. With that, you can download the presentation and the material; you can use the QR code that's in the booklet in front of you, on the first page. That might be a little bit easier and helpful.

With that, before we begin, let me point out the cautionary language that is part of our safe-harbour statement, as always. That's in all the materials we presented, are on the website and that we've published. That language applies to both days, today and tomorrow.

### **[See disclaimer](#)**

With that, I have one housekeeping item: do me a favour, guys; this device, put it on mute if that's possible. Other than that, please join me in welcoming our chief executive officer Werner Baumann to give you an update on the progress of Bayer Group.

## **Bayer Group Update: Executing on our Focus Areas**

**Werner Baumann**  
**Chief Executive Officer, Bayer AG**

Good afternoon, everybody, and thanks for making it out here. As Laura and Oliver already said, we are thrilled to have you here. This is a very special site. When Liam and I discussed the coming-together of our two companies, Hugh Grant was incredibly proud of Chesterfield – not

only that it's a beautiful site and this is the place where all of our expertise is, in seeds and traits development, but it has something unique to it. That was a major selling point to him. He said, 'Come look at this photo here,' and it was a photo from space. This is the only site, certainly around here, that you can see from space because, once it's lit up and you see the greenhouses, it really flashes. It is fantastic. Whoever travels to the moon in the next 15-20 years, remember that, because you will see this site from there.

I am acutely aware of me being the most boring part of today's programme, because everything else that is very excited is still ahead of you, once I'm done, so I'm only going to quickly update you on where we stand as a company, with some highlights and major points for you, some of which we already covered in our quarter-two release.

First of all, we are very much focused on the four key areas you see here for us to drive and deliver value as a company. Number one, of course, is our quest to grow ahead of our competition in our core businesses. Number two is very strong focus on cash and cash-flow generation here, as we deliver the company going forward. Number three is the profitability improvement that we are targeting between 2019 and 2022, with the plans that we laid out in the capital markets day. Number four is a very disciplined approach towards capital allocation that will also help form the improvement of the performance of the company, going forward.

Where do we stand? First of all, in terms of group target delivery, before I come to the divisions, we are fiercely committed to delivering against our 2019 and, with that then also, the following years' commitments in terms of top- and bottom-line growth. There are a number of levers that are driving that. Number one, of course, is operational growth. Number two is the integration and number three is the structure of programmes, and the restructuring that we have underway, all of which are solidly on track. Bayer 2022 is the major structural overhaul of the company. We updated you, as part of our quarter two. Wolfgang did it; we are fully in line with our planning.

Last but not least is the portfolio measures, some of which we have already announced. We are done with the divestiture of RX Dermatology. We have signed the divestitures of our Coppertone and Dr. Scholl's brands, and we are working towards also, at least, signing and communicating the divestiture of our stake in Currenta, where we are fairly far advanced, and then moving towards signing with the divestiture of our Animal Health business by the end of the year.

In our businesses, Consumer Health is on its way for a full turnaround. The business has returned to growth, with the US improving sequentially, but not yet at growth. That is what we are targeting for the second half of the year. A strong team has come together, substantially better funnel with our innovation and product development and, with that of course, a profitability improvement going forward, in line with what we communicated earlier. Pharma had a good quarter and some further good news in the pipeline. Last but not least, Crop Liam will shed much more light on, and his colleagues as well.

Before we go into the business, where do we stand with our glyphosate litigation? You know that we announced that we are pursuing, essentially, a dual-track approach towards appeasing the glyphosate complex. While we continue to defend ourselves in the current cases that have been tried, where we are also going into the next instances, there's a second avenue that was opened up, based on Judge Chabria's request, to start mitigation talks. We are heavily engaged in these discussions. We have a board committee and an additional adviser, who is supporting our supervisory board, John Beisner, the head of Litigation and Consumer Protection practice at Skadden. That is what we are working on right now.

There are a few cases that will go to trial prior to the end of the year. You see the three of them outlined here. Actually, all of them are in the vicinity, one in St. Louis County, and the other ones

in St. Louis City. Of course, this is always tentative, because there may be changes to the schedules that we may see in the next few weeks and months to come, but that is the current status. We are of course preparing for these cases, also with the learnings we have taken from past trials.

We are on track to deliver on our 2019 targets. We have qualified the guidance, naturally, because the weather conditions are very, very difficult for our Crop business, predominantly but not exclusively in the US, where it's been very, very wet – historically wet – in a number of states, but also with some, let's say better, impediments in Europe. With that, we won't see any growth of the market in 2019, compared to the 3% growth we had expected for the year the market would do. Yet still, with our overall business, with some contingency plans we have put in place – of course, our Pharma business does fairly well – we are fiercely committed to deliver against our 2019 targets. We have put the measures in place to be able to do so but, at the same time, we have to qualify that it's going to be a little bit tougher than we expected and that our guidance says. We communicated that it is increasingly ambitious to do so, since we are lacking the growth we assumed we'd have in our Crop business.

Synergy and efficiencies I already touched on. We are on track, actually slightly ahead, in Crop Science with the synergy realisation. In terms of in-market performance and management of disruption, we are doing quite well. Liam will talk a little bit more about it but, in terms of the other savings programmes, we are doing better than expected. Wolfgang mentioned that, for this year, we are expecting about €0.5 billion to be delivered and then, overall, the programme is unchanged for €2.6 billion growth that we are expecting from all of the programmes by 2022.

Portfolio I already mentioned, so I can glance over that very quickly. Pharma again had good underlying performance. We continue to see major growth in three areas that all of you know. It sounds like a broken record, but it continues to be good news. Number one, the biggest and most important product continues to grow double digits, Xarelto. Likewise, our second-biggest product, Eylea, continues to grow double digits. We've just upped our guidance for Eylea for 2019. Then, if you take the regional lens, we continue to enjoy spectacular growth in China and, at the same time, we are underweight in the US, which happens to be a more and more challenging market environment with some of the initiatives that are being driven by the US administration.

We are on a good track with pharmaceuticals and we have also had some positive pipeline news and product news, fairly recently. You still see on the slide darolutamide having been filed. As of yesterday, we received US FDA approval for darolutamide, which is not only great news for the company, but certainly also for the patients who are going to benefit from a new and actually safer option for their prostate cancer. In pipeline, that is one of your and our concerns: how can we further beef up our pipeline beyond our organic R&D activities? We are working with us recharging and overhauling our business development and licensing operations. You will fairly shortly see also some news on the personnel side and, at the same time, we continue to focus on driving our Leaps programme, with some further news to come in the next weeks.

Consumer Health I already touched on. The turnaround is solidly underway. Heiko is doing a phenomenal job with his team and we see a lot of things fall in place, with a very confident team that is not only poised to deliver on 2019, but also on targets for the next years to resume growth back to industry peers. That's where we are in quarter two, but then to go back to market growth in the next years to come and to restore profitability.

Crop Science – I'm not going to dwell on that slide, but let me much rather go very quickly to the path to the future. You will see a phenomenal programme today, looking at what the businesses that have come together can really deliver. You will see some of the first things that are going to come out of our combined strength, going forward. You will see a profile that is unmatched in the industry, the innovation power that actually stands out compared to all of our competitors that will,

of course, drive long-term sustainable attractive growth, better products, better and more sustainable solutions for our customers, a better protection of our planet and, I also believe, superior returns for you, as our owners.

With that, it's now my pleasure to hand it over to Liam, who is going to lead you to the next part of Crop Science. We are very much looking forward to an exciting day that we are spending together. Thank you, Liam.

## **Shaping Agriculture for the Benefit of Farmers, Consumers and the Planet**

**Liam Condon**

**President of the Crop Science Division, Bayer AG**

Thanks a lot, Werner, and a small explanation for the wonderful music: for those of you who are not from the US, that was 'Gloria'. The story goes that the St. Louis Blues were a losing team that was not doing well at all. A few of the players were in a bar and this music came on. The mood suddenly became really positive, and they thought it would be a good idea to play this music at their games. They started playing the music and they never looked back. Ever since then, they've been winners and they're champions. That's the background to the 'Gloria' music. For us here at Bayer Crop Science, this has a special relevance because, whenever we're feeling challenged, somebody will say, 'Play "Gloria",' and then we feel good again – so I get to play this about twice a day.

Very briefly to kick it off, we mentioned the Q2 results and a lot of the stuff that we talk about is abstract, and there are numbers, but you have to see the impact of what's going on in the market. You're going to see some wonderful stuff tomorrow, but this is just a picture of one of our customers in the US. It shows you the dimension of the flooding that's been going on in the second quarter. We have a customer here today who 50% of what he works on is planted and 50% is under water – five zero. These are tremendous impacts. It's incredible the amount of rain that we've had, particularly in the second quarter. It has a huge impact on the business overall but, as we indicated on the second-quarter call, we are still sticking to our guidance for the year, because we see enough elements to give us confidence about the future.

We don't take our R&D decisions based on one season. What we're going to be talking about over the next one and a half days is all about the innovation that we're generating, which we're investing in. What I'm most excited about is you're going to actually see this physically, and it is phenomenal, once you see it. We're really proud of the folks who've been able to put this together in the field, because they've been working with the same weather as all of our growers have been working with, and still have managed to put together some wonderful plots, so there's a lot to be looked forward to, over the next one and a half days.

Very briefly, we already flagged this last year at capital markets day but, just to remind everyone what we said when we set out as a combined company, what we want to be known for is we want to generate more innovation, faster than anybody else. We want to be the digital pioneer in ag and we want to see new standards of sustainability. This is what we said in December to you that we want to do – and, of course, deliver on our financial commitments. What you will see now, again over the next one and a half days, is how this is starting to come together. I emphasise *starting* to

come together. We've been together as a combined company for less than a year. We had to bring people together into teams and technology platforms, so we're only at the beginning of a journey, but I think you will see, from what we show to you over the next one and a half days, is there is already amazing potential there today. It's clear that there's a lot more to come and we'll be showing this to you.

The numbers you know. From a sales point of view, these are pro forma numbers. Our significant investment in R&D – so, clearly, we're the market leader today, but our intention is to be the innovation leader and that requires a significant investment. That investment turns – and that's not on the slide – into a very profitable business for our owners. If you do a like-for-like comparison of margins of where are we today versus peers, where we are going and what's the ambition level, if you look at our targets for 2022, this is simply in a different space, but it's built on a commitment to delivering innovation.

The numbers speak for themselves. These are all third-party-sourced numbers. In each of the key crops, whether it's corn, soybeans, horticulture or cereals, we have the number-one lending position. Sometimes it's a mix of branded and basically licensed product, but we take everything together because we get paid for everything. That's the reason why we're number one in basically every crop. We also have the leading digital platform. I'll talk a little bit about this during the session. You're going to hear more and more of this over the next one and a half days, and this is a crucial part of the overall portfolio as an enabler for us, for our overall business.

To give you a sense of what a fundamental role this plays, we're going to go back to the basic question of how are we going to help growers increase their yields in a more sustainable manner. What we're saying is we're going to deliver tailored solutions, which is basically customised solutions, for every grower, so a solution that is completely specific for the grower's needs in a specific field and in a part of the field – so a very precise recommendation about what to do to increase yield in a sustainable manner. Now, we know that yield is a function of genetics on the one side. We have the leading genetics in the industry. We know it's a function of the environment and now, thanks to FieldView, our digital platform, we know more of what's going on in a field, many times, than what our growers, our customers, can actually see. We have data layers upon data layers of what's happening in real time, in a field, and we can tell product performance not just of our products, but also of our competitors' products.

You can see here a FieldView yield map, which shows on one field a yield differential of 75 bushels per acre, so the red being the low yield and the green being the high yield. Of course, you've got to plant differently in each part of this field. You're going to be using different crop protection and different rates of fertiliser on the field but, if you have this information, it allows you to reduce the variability that is inherent on every field. We know that variability is tremendous. We know it, for example, from the national grower contests. If, for example, you take corn, the number one grower in the US can get 542 bushels an acre, versus a national average of 175. This is in the US, the most advanced market in the world. You still have this tremendous variability, so we think there is a tonne of potential to still improve yield and to do this in a sustainable manner.

The third part is farming practices. These are the 40 big decisions that each grower has to take every season. With our digital platform, again, we can give very precise recommendations to growers to optimise their decisions. This is the fundamental piece and why it's so important for us to have a leading digital platform.

How we've progressed over time, and you'll see this live tomorrow – I know the image, for some people, maybe doesn't look so stellar, but let me briefly explain, because this is really unbelievable. You see the plot. Again, you're going to see this live tomorrow. In 1940, to get 10 bushels of corn, you needed that much land – not just that much land, you needed a tonne more water. You would

need fertiliser. You'd need way more crop protection inputs, so a lot of resources to get to 10 bushels per acre. That land is then not available for biodiversity. You see the progress that's been made by the 1980s, and then it continues and continues and continues. You see 2019, where we are today: way less land. Again, for anybody who's interested in sustainability and biodiversity, actually, a key solution is to produce your food on as little land as possible. This is exactly what we are doing. You can see here, of course, you're going to need less water. You're going to need less inputs, fertiliser and crop protection. Some people are sometimes maybe a little bit afraid: well, if you're selling less inputs, is your business model in danger? I can tell you clearly we earn a lot more money today than we did in the 1940s, and our business will not be volume-based going forward. It's going to be based on the outcomes and the value that we generate.

The last part, the future part, for the unaccustomed eye might not look so exciting. 2019 and the future, you say, don't look so great. The difference is 2019 is today's corn. What you're going to see tomorrow is the future of corn, which is short-stature corn, so much smaller plants, which have multiple benefits that Bob and the team are going to talk about and explain tomorrow. This, both from a yield and sustainability point of view, is a massive advance. You'll get a better sense of that tomorrow, when you see it in the field.

How we bring all of this growing better and increasing yield more sustainably together is, ultimately – and this was really the vision behind the combination of the two companies, bringing them together – to be the innovation leader. What we basically did was take the market leader in breeding and biotech – clearly legacy Monsanto is, by far, the market leader – the innovation leader in chemicals and biologicals, which is more the legacy Bayer business; and then, in the data sciences, the leading digital platform is Climate Corporation, which is a subsidiary of legacy Monsanto. This is where the magic sauce or the secret sauce of the combination is because, in each one of these platforms, we are a market leader. We're a world-class champion in each of those platforms, in the agricultural space. We can take on anybody in each of those platforms, but the real value of the combination is then when these platforms start to converge and we're working across the platforms to get the best solutions for our growers. That is something that nobody else can do, so we've got the depth and the breadth, and it's the combination of bringing it together that is going to power innovation, going forward. Again, Bob and the team, as you go through today and tomorrow, are going to be talking more to real, concrete examples about how we're doing that.

The Digital Ag platform that we have, Mike and the team are going to talk about this. Last year, we were on 60 million paid acres. This year, we're trending for 90 million paid acres. We sometimes get the question: what's the P&L of this business? This is a platform and it's an enabler for us for a completely new business model. I'll talk a little bit to that. We don't see this as an independent P&L component; we see this as an enabler of our entire business, going forward. What's key is that we're on as many acres as possible and that we're generating more data than anybody else. You've got to remember that we have the biggest field trial data bank compared to anybody else out there. We do more field trials than anybody else. We have all of this rich data from our own research and development, then we combine this with all of this grower-relevant field-specific data. This is a treasure trove of data that we're dealing with, and is something that we're scaling up rapidly.

The platform is open so we have, in the meantime, over 60 partners. Each partner, for example an irrigation company or a drone company or a soil fertility company, brings a different layer of data to the platform. Then we can develop more of the tailored solution, the specific, customised prescription for each customer, based on this vast variety of intelligence that we're gathering every day, in real time, in the field. You're going to hear a lot more about this over the next one and a half days, as well.

What we're moving towards, and I mentioned it briefly, is a concept around a new outcome-based business model. I spoke briefly about this at capital markets day and it all probably sounds a bit abstract, but also on this slide it will still sound a bit abstract. You're going to see tomorrow how this actually comes together. The basic idea is we have a leading portfolio. We can give a customised prescription to a grower and then offer, combined with that, an innovative pricing model depending on what outcome the grower actually wants to get. If it's maximum yield, for example, we will predict what the yield will be. If you follow our advice, we'll predict what the yield outcome is. If we generate more yield than we've predicted, we will share in the upside with the grower. If we do not generate the outcome that we have predicted, the grower will not pay what we have proposed as the original price. So we derisk the grower, but we also share in the upside. You only go this far if you have really, really strong predictive capabilities, because you're making a promise and you're basically telling the grower, 'We're willing to derisk you if you're willing to also share in the upside with us.' You have to be very confident about your predictive capabilities. This is something we've been testing already now for some time, where we believe our predictive capability is so high we can scale this up. You're going to see and hear some specific examples of this.

How it looks in the field is also something you're going to see tomorrow. You're going to see an average-type cornfield, then you're going to see one with a tailored solution that we already offer today. We're not talking tailored solution some time over the next decade that we're going to get there – a tailored solution already, with an outcomes-based pricing model. We're already in the field in certain areas, offering this today. Then you're going to see the next step, a future-oriented business model. We're not happy with just what we're working on today; we're of course already working on the next steps. This is something that you will, I hope, find as fascinating as we do, when we go through these examples tomorrow.

I won't dwell on the numbers. They should be known also from our capital markets day. The key thing is we want to grow above market, but our commitment is we're going to be the profitable growth driver in the industry, so we're targeting an EBITDA margin in 2022 north of 30%. You'll have seen already from our first-half results – and, of course, we do the biggest, most profitable part of our business in the first half – even this year we were at 30%. We've given an outlook for the year around 25%, but we're very confident that we're going to get to north of 30%, again based on the innovation that we are generating and the value that we're creating, at a grower level. This is a different ballpark. This combination of above-market growth and industry-leading profitability is something that is quite unique, but also something you could expect, if you look at the portfolio and the people who we have in this company.

A word on synergies: Werner already mentioned we are very much on track. Important to highlight here, compared with, for example, one of our competitors that I won't name – which happened to have an analyst call this morning – their cost synergy play is fairly well advanced, in the sense that they've already generated a lot of their synergies. They're in the EBITDA that they are explaining today. We're only at the 20-25% level. There are a lot more synergies to come. Right now, we're tracking today, so we feel very good about our forecast, but these synergies are still to come. On top of the organic business, that's also what's driving the margin accretion over time.

From a cultural/people point of view, I get a lot of questions, 'So how are things going?' You're going to meet a tonne of people during the next one and a half days. I would challenge you to guess who's from legacy Bayer and who's from legacy Monsanto. I would challenge you and you will find it very difficult to figure it out because, our experience has been, once we bring the teams together it just functions as one high-performance team, which is working on truly shaping ag.



A last point before I wrap up here: we said as well last year we want to set new standards of sustainability. We're starting to flesh out those commitments. We're still at a relatively early stage here. You're going to hear more about this a little bit later in the year but, as a basic ambition level, what we're working towards is, in essence, a carbon-free future for ag. There are many people out there who are seriously concerned about climate change, and there are quite a lot of people who think that agriculture is actually part of the problem of climate change, because of emissions through agriculture. We believe there's a possibility for agriculture to at least become carbon-zero. Ideally, and this is also something we'd like to pioneer, we'd get to a world where growers are getting rewarded for sequestering carbon in the soil, so actually getting financially incentivised. This is something that we can track with our FieldView and that we're working towards tracking with our digital platform, about what is the carbon footprint on the farms, so that we can help growers also get rewarded for doing the right thing here.

We're going to have a significant reduction in the environmental impact of inputs, and one of our goals is to empower 100 million smallholder farmers. Why is this important? A lot of the population growth we're talking about, the 2.5 billion that will come by 2050, is largely sub-Saharan Africa and Asia, to a large degree. These economies are 80% dependent on smallholders. They cannot just import all their food from the US or from Brazil, so we need a step change in productivity of smallholders in those geographies. Otherwise, there's going to be a social implosion, simply based on the demographics of those regions. It's really important that we, as a market leader, play a leading role here in helping enable smallholders.

That's in essence it. Our goal, our number-one priority now, is: to successfully integrate the two companies and have the most successful combination possible; lead in innovation; pioneer the digital transformation; set new standards of sustainability; and do that in a way that generates true value, not only for our growers, but also for our owners. We're incredibly excited to have you here and looking forward to lots of dialogue and interaction with you. With that, I'll gladly hand over to our chief innovation officer, who will generate a bit more excitement about all the innovation we're working on. Thank you very much. Please welcome

## **Delivering World-Class Innovation**

**Bob Reiter**

**Head of R&D, Crop Science Division, Bayer AG**

Good afternoon to all of you. First of all, it's a pleasure to welcome you again – as Laura mentioned – to Chesterfield. We're very proud of our site here and, more importantly, we're extremely proud of our science. I can only tell you that my team and I are looking forward to showcasing to you both our capabilities and our strategy, in terms of how we are inventing and developing the most innovative pipeline in our space, and also the opportunity to take you tomorrow to the field, where you can, first hand, experience some of that output.

The other piece for me is that this is one of two days this year where I don't have to make that really important decision – somebody else has done it for me – on what the hell I'm supposed to wear. I'm kind of happy about that as well, so thank you, Laura, and thank you, Oliver, for that. Although, really, the tablecloth look I'm still not quite settled in on.

What astounds me and excites me about the amazing capabilities of Bayer Crop Science is, obviously, the resource capabilities that we have as an organisation and the immense talent that we have in this organisation. As Liam shared with you, you look across at our capabilities; we really do have the number-one capability in every facet of what we're trying to deliver to our customers. So, with the 7,300 R&D employees who we have around the globe, the infrastructure that we have in places like Chesterfield, the diversity of locations and sites around the world that we use to serve our customers and develop new products, it is simply world-class and it is unparalleled in our space. It is fundamentally my mission and the mission of my team to harness all of these capabilities and create that new value for our customers. Our entire strategy, at the end of the day, has to begin by having the leading products in the market. That is what we create and that helps us to set in motion this entire strategy behind tailored solutions.

What we have to our benefit is the outputs of all that scale and capability. As we brought the two organisations together and brought our portfolio together, we have a tremendous depth in our pipeline. You'll get a first hand look at all of that today and tomorrow, as you see the various components of what we're working on. Ultimately for me, it's how these pieces come together for our customers. You'll hear later on from Mike about how we're further going to unlock new value through digital and what that will ultimately mean for our customers as well, in terms of how they use our products and how they bring those products together in a very unique and specific way, on each individual field and on every square metre of that farm.

One thing that's extremely important for us as a research team is to be excellent at what we do on a day-to-day basis, but then also continue to harness and leverage new technologies that can help us further advance the science that we're doing. We're focused as a team on ensuring that our germplasm is best in class, because the seed that a grower plants in the ground is ultimately the source of the genetic potential and yield potential on the farm. You'll hear later today from our team about the advances that we've made in the last years in terms of how we produce and develop those new seed products for the market.

You'll hear our story about the new modes of action that we're developing in some areas like weed control, where there's literally been no innovation for decades. We have that same innovation capacity in crop protection and in biotech to solving problems like insects, our efforts in disease control, using biologicals and crop protection, and then ultimately how we choose and fit all those pieces together on the farm, for our customer, in every market segment that we work in – whether that's in the horticulture space, with its vast diversity of crops and markets, or in the large row crops in the Americas, like corn and soy. Finally, we're using things like our formulation competence, which allows us to further create additional long-term value with the work that we've put into these new actives that we've developed over the years, help to further expand the overall value in the market and help our customer solve new problems.

But disruptive innovation is also critical. It is areas like gene editing, creating new data types and new science in that space to help further advance how we do things. You'll hear the story about precision breeding, how we're continuously refining how we do breeding, evolving it from something where everything was decided in the field by a plant breeder looking at the crop and running a combine to today, when we generate so much data in the lab and are using new ways and new types of data to further exploit decision-making, and using artificial intelligence to drive our decisions.

Finally, you'll hear from Mike in more detail about how customer data is going to become so incredibly critical, not just to make decisions on the farm, but also to help inform our pipeline and the decision-making we make in the work that we do, every day, in Research and Development.

So digital and external innovation, I believe, are two core pillars for how we need to further advance what we do. The vision I have for our R&D organisation – and we're well advanced in many areas in this space – is how we continue to use digital and new data types to touch the work that we're doing. You'll get a good glimpse of how we've been exploiting that and further harnessing that in crop protection, in breeding, in biotechnology and in biologicals. You'll also get a chance to see what it ultimately translates into for our customers. It's very important that we continue to evolve our decision-making in our science today in order to create new advantage for the products that we want to create in the market for the future. Ultimately, we have a vision of really having what I consider to be an 100% data-connected pipeline, because we know that the discoveries and the data we use in discovery flow all the way through and need to be linked, ultimately, to the data that collects on the farm with our customer. It's that continuum and bringing those two things together, from beginning to end, that I think will fundamentally reshape how we're doing our science. We are clearly more advanced in doing that than any company in the world.

The other side of it, of course, is we need to continue to access external innovation. Last year, we signed over 60 new collaborations or extensions to existing collaborations, because this is so fundamental to our strategy about how we want to advance our science. One of the deals you'll hear maybe about, today or tomorrow, is one with Arvinas, which is one that is not only benefiting Crop Science, but also is benefiting our Pharma space as well. It's these kinds of innovations that we have to be first to, to capture, leverage and harness in order to produce new products for our customers.

What is really cool for me and exciting is the fact that we have the capacity, with all of the products that we're generating, to help our grower from that first decision about what to plant, all the way through the growing season to harvest. Our portfolio of products touches all elements of that pipeline for the grower. If I look at the various products that we have, when we think about yield establishment, it's the choice of that seed. What seed am I going to plant? What are the very best genetics? Where do I plant them? What density should I be planting them at? What is the seed treatment option that I should apply on that seed? Should I go to a new revolutionary crop, like short-stature corn? Once that crop's established, you'll get a real good sense in the field tomorrow about what it means to control weeds and what happens when you don't.

We have a portfolio of products, beginning with our biotechnology platform, which gives growers many options and more options in the future, to the chemistries that we allow and have for our growers to fine-tune and help to ensure that they have consistent, season-long weed control from pre-plant to harvest – dealing with pests, using both insecticides and biotechnology tools to help control those pests during the growing season and maximise that yield potential. Finally, diseases, which are widespread throughout all crops and can show up at different times, depending on environmental conditions – one of the huge opportunities I see is how we'll be able to better refine and predict for our growers, and better optimise the use of this entire portfolio and array of products that we have available. Ultimately, it all comes together by creating new value for our customer, both with the new products that we invent and how we help them to better use them, in a way that's really been unprecedented in the past.

You know, kind of a measure of the integration and also the great opportunity that was set up when we brought our organisations together is a slide that we've used before, talking about parallel development in herbicides and in having a trait system for that herbicide. You'll hear later today, and you'll actually get to see, one of those chemistries which is in early development and hear the story of how our teams already, in biotechnology, are actually working on how they will invent plants that will be tolerant to brand new chemistries. What's incredibly exciting for me is not only is it a new chemistry; it's an entirely new mode of action for weed control. This is the promise of

what we were looking for, as we brought our two organisations together, and it's a tremendous proof point about the power that our organisation is just beginning to tap into.

Key takeaways really: I hope you understand the scale and the enormous value-creation opportunity that we have with our pipeline. Engage with our scientists today, tonight and tomorrow. Ask lots of questions. They're excited to tell you and showcase the great work that we're doing. Open innovation and digital are core to our strategy, and we really do have an industry-leading pipeline that will ultimately translate into real value creation for our customers and for our business, and for you.

The last thing is I just want to briefly introduce my leadership team. All of those who you see highlighted in green are going to be with us for the next day and a half, so you'll have a chance to interact with really the best people in the industry in research and development in agriculture. So please take the opportunity. As I said, my team is super-excited; we love to show what we do. It's fun for us and, hopefully, you'll learn something along the way. With that, I will turn it over to Dr Mike Stern and he'll talk about why digital is going to make a huge difference for us.

## **Pioneering the Digital Transformation**

**Mike Stern**

**Head of the Climate Corporation and Digital Farming, Crop Science Division, Bayer AG**

Good afternoon, and thanks, Bob, for the introduction. It's great to have you all here and I'm very excited to give you a 10-minute-or-so overview of where we are with digital farming and our FieldView platform. The neat thing is the stuff I'm going to highlight today you're going to have a chance to see more of in our tour this afternoon and in the field tomorrow. So some highlights, then you'll be able to go ahead and follow up with the teams, as we go through the next day and a half.

Liam already showed our commitment to our paid-acre growth of 90 million acres this year. I just want to let you know we're well on track to achieve that. The reason why we use paid acres, just to be clear, is this is a measurement that we think is relevant. It is a measurement of a grower actually paying us for our services, and these paid acres also come with them sharing data with us. Okay? There are lots of other measures out there in the industry – we hear about platform makers and things like that. We're going to stick with paid acres, because we really think it's a great measure of customer commitment and the value they see in what we're generating, in the fact that they're sharing data with us.

Recently, in April this year – every year, we run our brand health survey. Once again, you're seeing that across this brand funnel, FieldView is recognised as the number-one brand in digital agriculture. We're very proud of this and we see this, of course, reflected in our acre growth. We are operating now in 22 countries. We just recently launched in Argentina; I think it was three weeks or so ago. We are continuing to look at where we can expand in the future. We feel that there's no doubt that we have the largest, broadest footprint in digital ag, in the world.

What's unique for us and for our customers is the technology that we developed called the FieldView Drive. It's shown there; it's a little device, I don't think even the size of a golf ball. It plugs into a diagnostic port of all sorts of different types of farm equipment, and what it does for a farmer is allows them to simply and easily digitise the activities on their field. When we talk to our

farmer customers around the world, one of the main things we hear, over and over again, is, 'I have a lot of data, it's not organised and I don't have a lot of useful information from it.' This device allows growers to go ahead and digitise their activities and store their data, and it also stores that data in their account, so they can see it at any time, and they share it with us in our cloud.

This is just an example in North America of the scale with which we are working with customers to gather data and report back what their activities are, within FieldView. Back in October, on a single day, 18 October, we had over 10,000 combines – those are the blue dots – actually streaming data to us simultaneously, in the US and Canada. We can generate this picture also in South America, and we can generate this picture now in Europe as well. Some of the new data we're getting though is the planter data: 16,000 planters since the beginning of the year, in the mid-west, streaming data to us. The newest source of data is 4,500 sprayers, so we have been working very hard to get spray data. The reason for that is this information can now help us better inform farmers how to make better decisions on how to use crop protection chemistry in their fields, so really critical data elements. You can see the growth of and the ease with which we can go ahead and work with farmers to go and collect data.

As I mentioned, data collection is core to what we're trying to do. This is just an illustration of how this is accelerating. On the y axis here, those are 5 million hours of streaming data. That's the increments. Our first 5 million hours of streaming data into FieldView took us 23 months to get. The second 5 million cumulative hours of data took us 10 months to get, and the third 5 million hours of data have taken us only three months to get and we haven't reported yet on the 2019 season. So this is a critical element and a differentiator for us.

You remember Liam's slide, where we think about yield as a function of the genetics in the field, the environment that those genetics are exposed to and the decisions in the farmer practice. This is a way for us to work with our farmers to organise that farmer practice data. To be clear, the growers own this data. We have a very clear privacy policy. It is their data; we only do with it what they agree for us to use it for. If they don't want us to have it, we allow them to go ahead and create an avenue for them to port it to any other platform that they would like. So it's really important, and this is a bond that we have with our growers. The reason why they're willing to share data with us is because they can see that we can create value for them on their farm with it.

There's no doubt that, as with everything in our society, data is becoming a new currency and it's no different in agriculture. We have a very unique platform to go ahead and collect data and utilise data. We have an extensive amount of our own internal proprietary data, from our own field trials and genetics and crop protection chemistry, and biologicals and seed treatments. We collect an enormous amount of publicly available environmental data on weather that we use, and geospatial imaging. Of course, I talked to you about grower data.

This all goes into a flywheel. At the beginning, on the left-hand side, gather and organise data is the base value proposition of FieldView and FieldView Drive or our customer. Let me organise my data; put it all in one place. Then I can begin to go ahead and make some straightforward comparisons, and to understand this we can visualise this data. We can make comparisons for them on their fields about what they planted and the relative yields of different products on their field, different soil types and different conditions. The left-hand side of the flywheel is getting data in one place and helping them visualise it.

As we go around the flywheel, we begin to apply our data science and our capabilities, and the infrastructure investments that we've made, to bring advanced computational tools and techniques to this data, and not just to the farmer data set, but to the whole data set – our genetics, our environment and our farmer data. That leads us into this new realm of how we can begin to diagnose problems. How can we begin to prescribe solutions? That's really what a grower's

looking for; they want us to help them make more informed and valuable decisions, in real time, to help them manage the crop in their field today – and in their field, not something that's a plot that's 20 miles away. So I can go ahead and look at a bunch of different hybrids or different chemistries. What's actually happening in their field? If we are successful in doing this, the growers will see this value and they'll begin to enter the data with us, and work with us again the following year. And the flywheel continues.

This is really what we're about at Climate with our FieldView platform. How can we help growers organise and bring data together? How can we upgrade the value of that data, so we can help them make better decisions to drive productivity, help them better manage risk, help them simplify their operation and farm more sustainably?

We see three ways, right now, that we can generate value for these technologies. One is our agronomic services, and you'll see some examples of that. We think about agronomic services as services that we actually sell directly to the farmer. Our FieldView Plus and Drive subscription would be an agronomic service. We sell that to the farmer.

We've also begun to launch new recommendations, at the right-hand side of that flywheel, where we're upgrading data. This year, we've launched our advanced seed scripting in a big way – and I'll show you a slide on that – and our seed placement adviser. You'll hear more from Sam Eathington this afternoon about that. It is an adviser that allows us to help a grower make a better decision on the genetics they should plant in their field. We're seeing tremendous yield advantages to doing that. So that's our agronomic services. By the way, if you asked me to talk about this four years ago, that's probably all I would have talked about. I would have said our business model was selling information to the grower directly. It's an important piece of it, but we have learned it's not all of it, by any means.

We believe we are the largest platform in digital ag today. The FieldView concept there is we're going to have partners; we're not going to be the inventor of everything. But one thing we hear from growers all the time is, 'Look, I don't want to have 15 different apps on my phone. I want to go a single spot, where I know I can get reliable digital information that can help me do a better job of managing my operation.' FieldView will be that spot. We have over 60 partners today, and we are constantly signing up more partners. The whole concept there is we're going to connect digital innovation to farmers. Farmers can go to a single spot to go ahead and purchase these tools. All this data then sits in their FieldView account.

Lastly, it's enterprise value. Enterprise value is how we can use these tools to actually drive our commercial business more broadly, drive our R&D efforts and help us in our supply chain. We're beginning to see lots of examples of where our digital tools being applied to the farm are actually also helping us in our commercial business. You're going to see some examples. Liam talked about our outcome-based pricing models, where we can go ahead and begin to share risk with the grower. We can do that now with some pilots around corn. We're doing that with some pilots around fungicide applications, and it's all based on the fact that we have information specifically about what's going on in their fields, how we can use our own data to help model that to help make better recommendations, so we can actually share risk with the grower, and that's going to drive our business.

I'll give you an example in supply chain. Every one of our contract growers who grows our soybean seed in the United States, by contract, is on FieldView. That gives our supply chain an incredible view into what's actually happening in those critical seed-production acres in helping drive better productivity and understanding the timing of what's going on, on those farms. We're going to continue to see all sorts of ways where this is actually generating enterprise benefit.

A quick example of something new this year – I've talked to you about how we're taking data and we're moving around that flywheel to recommendation – is our scripting platform. You can begin to see now how our seed prescriptions are really taking off in the marketplace. We have two types of prescriptions out there, built on that common platform. One is a manual script, where a grower can go ahead and use our FieldView tools and our scripting platform, and they can enter in their own variable-rate seeding prescription. They work with FieldView to do that. They beam that up into the cloud. It beams down into the cab of their planter, and they automatically go ahead and plant that variable-rate seeding prescription.

The other one is an advanced seeding prescription that we're actually selling to a grower. We can see an advantage of about 5 bushels an acre there. That's a brand-agnostic tool. We have over 2,200 different hybrids, not just ours, all across the industry that they can use. There's a requirement for some yield data that they have in the FieldView system and we can go generate this seeding prescription on their field that takes into account their field dynamics and historic yield events. Again, very simply by the push of a button, up into the cloud, down into the cab of their tractor, and off they go planting.

Now, what's really neat about this is that this is a base platform. I'm showing you this in seeding. It's going to be the same platform for variable-rate fertility and variable-rate crop protection applications because, if you're a farmer, you want to be able to layer all those different decisions on that field. If you're going to go ahead and plant your seed in a variable-rate way, then you're going to have to fertilise it at a variable rate. All of this sits in a single platform now, as part of our digital farming performance platform, and we're going to be able to roll these tools out to growers in a single spot, so they can go ahead and think about how they can optimise the inputs that they put into their field to drive productivity yield, manage risk and farm more sustainably.

So we're 90 million acres. We think, conservatively, there's a 1 billion acre opportunity in the market between wheat, soybeans and corn, and we believe we are uniquely positioned to be able to go ahead and grow into these acres. At Bayer Crop Science, we now have brought together leading seeds and traits, leading crop protection and the world's leading digital ag platform. We go to market through a global distribution and sales team that already exists today. We are working, predominantly right now, on corn and soybeans. We're working diligently on our products in wheat, particularly for Europe. We are very excited about what the opportunity for digital farming is and how it can drive value for our customers and for our business.

Just to wrap up, we have the leading digital farming platform in the industry, and I believe we are continuing to separate ourselves from our competition. We've invested heavily in our infrastructure that allows us to bring in multiple and large quantities of data, upgrade the value of that data and then redeliver it, in a very simple way, back to the grower for them to create value on their farm. I have no doubt that these tools, coupled with all the other technology that you're going to hear about today at Bayer Crop Science, will certainly be the next wave of innovation in agriculture and will go a long way to shape the future of how we think about converting natural resources to food. With that, thank you very much and I'd like to welcome Werner and Liam and Bob back to the stage, and Oliver, who's going to lead us in our Q&A.

## Questions and Answers

### **Oliver Maier**

Thank you, all, for the presentations. We've planned for about 40 minutes of Q&A. Laura and Ben will actually run the mics. Thanks for that. Please, if you have a question, indicate. If you actually ask a question, indicate your name and the company, which makes it easier for us, for the webcast. That would be great; thank you.

### **John Roberts, UBS**

Since it's an R&D discussion, maybe you can take us through your plans to replace part of the Roundup or all of the Roundup business, over time. You've talked about developing new alternatives to Roundup, so where does that fit into the portfolio?

### **Liam Condon**

Let me start with the business and Bob will take the pipeline question. Just to be very clear about it, we don't envision a scenario where glyphosate is replaced. Glyphosate is a base herbicide used all over the world so that, we believe, will remain a core part of the portfolio. But growers need choice; they need more options. This is one of the reasons why legacy Monsanto had also invested heavily in the dicamba Xtend platform, which we're in the process of rolling out. There's a multitude of other options that could be possibly available. We're the market leader in weed management, and the way we think about it is integrated weed management and not just herbicides. Glyphosate will, in our view, remain a base, but we need to offer growers additional options – maybe a little bit about what we're working on.

### **Bob Reiter**

I think Liam summed it up very well. We continue to invest in all aspects of where we believe we can have a very integrated system that creates a lot of choice for growers. We always have our eye on the reality, particularly with any pests. We are always diligently trying to manage against resistance – right? You'll hear today a lot about the work we're doing in weed control, specifically in crop protection, and some of the breakthroughs that we're starting to make in that space. That will help us in terms of providing additional options and choices from a chemical perspective.

Our trait portfolio, as you'll see today and tomorrow in the field – you'll see how we're creating more and more options for growers, so that they can better manage. But glyphosate still is an anchoring point in those systems. Digital is the other piece, because we know that there's an optimisation that can continue to evolve, in terms of how growers use these various tools that we're creating and in order to help them manage and integrate them, in the best way possible. That's the core of our strategy.

### **Christian Faitz, Kepler Cheuvreux**

Just one question: we heard a lot about your customers' problems, given weather conditions here in the mid-west. How are your own seed production efforts doing for the next year, in terms of your growers? Thanks.

### **Bob Reiter**

We're in a good place. First of all, we tend to use fields in operations in a very distributed fashion, so our seed plants are located all the way from Nebraska to Michigan and Indiana, so we have a



very wide spread to help manage against exactly what we just saw, which is when you have environmental risk. We tend to be on more productive acres than average, with our footprint, and so we feel pretty good about our overall situation with seed production. I don't think that's an area that we're looking at right now and saying we've got to flag.

### **Jeff Zekauskas, JP Morgan**

I have a question for Mike. Mike, if you took two farmers, who both had – I don't know – 1,000 acres in Illinois, and one was a tremendously experienced, sophisticated farmer who really understood your digital technology, and the second farmer was a naïve person who really doesn't use technology; how would the very sophisticated, experienced farmer use FieldView in order to assist him in managing his cornfield? How would he think of the real value that he got from the technology? Then, could you do that in the case of the naïve farmer; how would they use the technology differently?

### **Mike Stern**

That's an interesting question, Jeff. In any new technology, there are always leading-edge growers who are out in front, and we've seen that in the development of our biotechnology traits and in the chemistry, and the same thing with digital tools. The grower who might be, you say, more sophisticated is going to go ahead and do much more with FieldView. It's going to utilise more of the tools. It's most likely going to distribute that information across an operation that he or she is running, so there is a sharing of data and a collaboration platform associated with FieldView. They will probably spend more time doing their own script writing. As I mentioned, there's a manual script, as well as an automatic or advanced script that we make.

The other thing that you're going to find with the more advanced farmer is they're going to do more experiments on their farm, and that's one of the neat things we're seeing with FieldView. It's a platform that growers can more easily conduct experiments on their farm and, instantaneously, see the results of those experiments. A more sophisticated grower, you might find, is going to do much more split-planter runs on their farm. Within a planter, they will put different seed products, or in a row by row or two- or three-row basis, and those types of things – so more experiments, probably more sophisticated in utilising the different tools, maybe writing some of their own scripts and comparing them to our advanced scripts, that type of order.

I think a grower – and we have those growers – who is earlier in the curve, we see that we're going to spend a little bit more time holding their hand, in setting up the system, actually getting the system set up and mapping their field just to get it to a basic level of being able to utilise the system. Again, I think what you're going to find there is that this is much more initially – and we've seen this – 'How can I get some data all in one place? How can I actually see what I'm doing on my farm, and be able to begin to do some simple comparisons?' With digital tools in general, what you want to do is take that less sophisticated farmer and help them move up the curve, so they can get more value out of the tool. For the very sophisticated farmer, we have to innovate even faster to be able to put new tools in there that create even more value for them. That's how I would look at it.

### **Liam Condon**

Maybe to get an advertising plug in, we have tonight a customer panel, where we also have very sophisticated customers. They'll be talking as well about their experiences with the digital platform.

**Peter Verdult, Citi**

First one for Bob or Liam: just the €17 billion of peak sales that you call out in the presentation from near term and recent launches, or €30 billion in total – what timelines are you working to there? For Liam or Mike, you've talked about 60 million digital acres in 2018, 1 billion global acre opportunities longer term, but can you help us set a baseline? Those 60 million today, what revenues are you generating? When you're sitting with your team getting pumped up with 'Gloria' and talking about the aspirational revenue going forward, what number are you talking about here? I'm sure you want to do more revenue per acre, going forward. Thanks very much.

**Liam Condon**

Thanks a lot, Pete. Maybe on the first one, the €30 billion, how does that number come together? It's the peak sales non-risk-adjusted, just to be very clear about it, going forward. Peak sales vary very differently, depending on whether it is seeds and traits or crop protection. Typically, crop protection products would have very long lifecycles. It's not unusual to have products that still, 30 years out, are only achieving their peak sales. Seeds and traits, the turnover is significantly quicker, so you really have to break it down by whether it's seeds and traits or crop protection.

There's an element in here of replacement, which we've got to be clear about as well. It's not just purely net incremental sales. This is particularly relevant on the seeds and traits side, where the turnover is quicker. Typically, if you were to think of the €30 billion in net terms, this would be probably 50%, so €15 billion would be the net incremental lift and then that goes out over a couple of decades. To peg it back near term, how does that translate out? These were the numbers that give a 4% CAGR in the short term, but this is how we're mapping the different products out over time. On the digital ag platform, maybe, Mike, you can talk a little bit about how we view this.

**Mike Stern**

Let me give you a little idea of how we price today and then we can think about the future. Our subscription pricing for FieldView is around \$1,000 a subscription per year, independent of the number of acres. We also have a product in Brazil, an imagery product, that we sell for about \$400 a year. That's our base entry point. As you see us upgrading the value of that information, our advanced scripting – which I talked about today – is only on a couple of million acres today, although you can see our scripting platform is beginning to take off. We sell that for about \$1 an acre, but we think we generate about 5 bushels of value in that. Then our advanced seed placement adviser we sell for \$4 an acre. That's matching a genetics to a field, and is seeing a 9-bushel-an-acre advantage.

A couple of things: first of all, you're seeing those dollars or those prices significantly discounted from a typical, 'Hey, if we generate 5 bushels, we should capture maybe a third of that value.' The reason for that is it's going to take time for growers to begin to see the value of these tools. What we don't want to do is inhibit uptake and use of the tools by an overly aggressive pricing approach, in the early days. This is a very classic way of thinking about digital tools. The important thing is where are we and where we're going. You can begin to see the per-acre pricing and the upgrading value of that technology.

The second thing is, while we talk publicly about our pricing around our digital tools in the agronomic section, there's going to be a tremendous amount of value that you're going to hear more about that we're just beginning to understand around the enterprise, whether that be the underlying platform that allows us to think of new business models, that allows us to create more value for our grower. We're in very, very early days – in fact, just piloting these things this year –

on how we can begin to utilise these tools to drive our broader business. I have no doubt that we're going to be able to do that, so that's kind of where we are.

We are targeting, 'Hey, can we get to a breakeven of profitability point versus the investment, sometime in the next three to five years?' It's very early days for us and for the digital ag industry. I feel like we're in a very unique position that we've been able to really define buckets of value and demonstrate that we can get farmers to actually go ahead, purchase our products, utilise our products, and come back and utilise them, year over year. That's the beginning of the foundation of the platform.

### **Vincent Andrews, Morgan Stanley**

A bit of a follow-up on that: I've been thinking about the tailored solution, where you're going to share in the upside above some set level. How's that going to work financially? I guess what I mean is, if you come to my farm this year and you give me the whole thing, I do it and it works, and I give you my upside, what happens next year? Are you tied? Do you somehow have IP on that prescription that I have to respect and pay you for again or do you believe that what you could give me a year later is going to be so much more dynamic that I'm going to pay up for it again? How are you going to tailor the economics, so that it repeats and it's protected?

### **Mike Stern**

Thanks for the question, Vincent. If we just take what went on this year in the mid-west compared to where we last year, just as an example, this year in the mid-west, growers were really interested in information around nitrogen leeching. We're going to talk a little bit more about that out in the field and how short corn is going to help that, so every year is a little different. We do not have, quote, 'IP'. The recommendation is every year we will go to a farmer and say, 'Here is information that we have that we think is useful to help you derisk your farm? For that, do you want to enter into this agreement with us?' It's not an IP thing; it's going to be a year-to-year thing. As an anything in agriculture, as you know, if we're not creating value for them year to year, if they don't feel that this is an equitable deal – and it has to be a win-win, because we are managing risk and we're sharing risk with them – then they're not going to want to enter that deal and we're not going to want to enter that deal.

The key is the data. You wouldn't do this unless you had a mechanism to begin to derisk the field, to change the variability in that yield map of plus or minus 75 bushels, and that's what we think we can do with the tools that we're beginning to put together, so that's how we think about that.

### **Richard Vosser, JP Morgan**

Just thinking about the impact of climate change and the volatility that could bring in agriculture, broadly, what does that mean for your business planning and R&D? How should we think about that?

### **Liam Condon**

Maybe I'll start and Bob will take over. Clearly the weather is becoming more volatile, more erratic. In essence, what's happening is we're getting a mix of, on the one side, more drought in certain places, but also more flash flooding. This is impacted what crops are grown in what specific geographies. This is something that was also – if I go back to the fundamental vision for our company coming together – we could see a future that agriculture was actually going to be very much challenged. It's not just a thing of somehow churning out the yields that we've had in the past in the status quo scenario; the environment is constantly changing. It's becoming more

difficult. There's less arable land per capita available to get the yields that we need, and you're going to need a lot of innovation to deal with this. That was, for us, a fundamental driver. The specific impacts we try to map out per geography over time, and feed that back into our R&D strategy and try to help growers cope with it. That's just, high level, how we're thinking about it, but it is one of the biggest confounding factors that I believe and one of the most underestimated elements in ag: the long-term impact that climate change is going to have.

### **Bob Reiter**

From an R&D perspective, I think we're becoming more and more sophisticated to be able to adapt in a relatively efficient way to battle against some of this. If I just look at germplasm and germplasm performance today, and how well it can tolerate stress in comparison to what it could tolerate if you go back 20-25 years, and the genetics that growers were producing and using then, we've made tremendous progress. We are building more resilience into it. One of our advantages is we have a huge germplasm library that you'll hear about, which gives us access to genetics. The way we understand and know how to unlock those genetics today is far more different and far more effective for dealing with some of these things, than we did in the past.

I think our capitalisation, in terms of all of the tools and where we're really headed, in terms of prediction and better anticipating where things are going, just think about simple things like weather prediction. It continues to make enormous strides. Macro weather prediction, while today isn't the most predictive science out there, is also evolving. Also, our ability to identify pest shifts as a result of things like climate change, and how we have to adapt our technologies, is improving as well. Is it all perfect? None of us could have anticipated exactly what happened this spring in the US, and so there's something that you can't quite do, but then macroeconomics plays in all this anyway. In the short term it affects our business, but in the long term it has different impacts. From a technical perspective, we're definitely evolving our ability to deal with it.

### **Mike Stern**

I would just add that what we're trying to do with digital ag and our climate platform – even though we call it the Climate Corporation, we don't control the weather – the whole point there is can we begin to be able to make real-time recommendations for growers to help them manage these types of things. I will say our weather modelling capabilities are pretty sophisticated. Sam's team did some modelling about what the weather would have been this spring, and they predicted a very, very wet spring, and it turned out that way. Now the next question is: what about the frost? Is it going to be an early frost, given the late planting, and so we have a prediction out there as well. We'll see if it's right, so that model isn't quite ready for prime time, but those are capabilities that we're building within our organisation. Again, the point there is how we can help growers be more responsive, in real time, to the conditions that are affecting their field. That will not just happen overnight, but we're actually seeing some pretty interesting results there.

### **Florent Cespedes, Société Générale**

Two questions, first, on the FieldView paid access opportunity, the €1 billion opportunity. You gave us the breakdown by wheat, soybeans and corn, but could we have an idea of the geographical breakdown you have in mind. Is it mainly a North America opportunity or is Europe also an area where you see some opportunity, or LatAm?

My second question – I'm sure we will have more colour later today or tomorrow – is regarding the short-stature corn. On the picture you presented earlier in your presentation, you said that this is the future, but we don't see much difference between the other fields. Could you share with us which are the main advantages of this new product? Thank you.

**Liam Condon**

Thanks, Florent. Mike will take the first one and Bob will take the second one. To see the difference, you have to be in the field. You'll see it tomorrow, because the photo is from above, so you can't see the difference in height. You'll see it tomorrow.

**Bob Reiter**

I'm going to the second one first and I'm going to punt a little bit and tell you you're going to hear so much about this from the team that I'd, actually, almost rather just let you have the team explain all of the benefits, in the field to you, later. I think you'll get a far better appreciation for it then and can ask the question again, if you still feel you haven't got the answer. I don't want to steal their thunder, because it's a great story and you'll get a much better perspective when you're out in the field.

**Mike Stern**

On the geographic breakdown, corn and soy is very much an Americas play – North America and South America. Then, if you look at wheat, it's Europe, it's Canada, it's all over the world, the big wheat play. Our real focus on wheat right now is in Europe and how we can go ahead and begin to bring digital tools there.

**Steve Byrne, Bank of America**

Liam, I'd like to hear your view of what's going on in the soybean seed market, right now. I had a little seed company tell me yesterday it's a bloodbath out there, and your second-quarter results were pretty challenged in soybean seed. What are the dynamics in that that are driving aggressive pricing and, more importantly, where do you think it goes in 2020? You may have XtendFlex; does that give you an edge that helps moderate that some?

**Liam Condon**

Thanks, Steve. I honestly think it is a fair description to say a 'bloodbath' this season, if you look at what's happening. Of course, the number-one impact is the US/China trade conflict. The lack of China as a major buyer for beans has simply put a lot of pressure on the overall market. That's the number-one issue. The second one specific to this season was of course the weather. Fields were just too wet. The planting was a disaster. It was all too late, and growers need to take a decision: is it going to be corn? Is it going to be soy? If you're looking at the commodity prices, there wasn't exactly a compelling case to plant a lot of soybeans. The third factor, which is less obvious right now, less apparent in the market but is still playing a role, is the issue of African swine fever in China and the impact that this is having on demand. On top of the US/China trade conflict, the demand for soybeans is depressed or, let's say, lower than it would normally be, simply because of the amount of swine that had to be culled.

There are three massive elements playing into the market that, you could say, are one-offs. The US/China trade conflict, the weather and African swine fever all at once are like a perfect storm. In that environment, it's competitively even more cut-throat than competition normally is. There's more supply than demand and, with that, there's pricing pressure in the market very clearly this season.

Going forward, what's the outlook? The hope is that the US/China trade conflict eventually gets solved. It won't help anything this year. If at all, then it's relevant for next year. The assumption would be that we don't get the once-in-125-years bad weather again. The third one would be figuring out what is the real impact of African swine fever and the replenishment rate in China, and

how that will impact overall demand for soybeans. Going forward, we believe we have a very competitive portfolio. We've got very competitive genetics. We're looking forward to launching the XtendFlex platform for beans, which will then have three options from a herbicide point of view. We have high hopes for this technology, but hope that it will come into a normal market and not one that's been massively affected by special factors, particularly this year. Bob, do you want to add anything?

**Bob Reiter**

We've just got a dynamic with a very price-sensitive market and that's showing up in some of the grower decisions. As we add our XtendFlex platform, it gives us more options in the marketplace. Improving commodity conditions will definitely make a difference but, right now, that's not how the season has played out.

**Falko Friedrich, Deutsche Bank**

When it comes to future advances in gene editing and gene modification, this is obviously a topic that is controversially discussed in certain geographies and by certain political parties. Do you expect this to continue to be a smooth-sailing situation over here in the US or do you start to sense a bit of an opposition?

**Bob Reiter**

No, I think the US position is extremely strong. Candidly, we're enjoying very strong support from government agencies in the US, strongly even advocating for the technology and the platform, in contrast to the situation in Europe, where we're in a dialogue and a discussion about whether something needs to be changed. I fundamentally believe it does. That's the current dynamic.

My personal belief is that this doesn't really come to a head in Europe until somebody comes with a product into the market that, I would say, is really going to challenge the European position. That may not necessarily be purely from a cultivation perspective; it just could also be from an import perspective. There's lots to go here. What we need is advocacy. We're doing everything we can as a company to try to advocate for change in law in Europe in order to allow this technology to be used. We believe it's a fundamentally important technology to have access to and it creates a difficult dynamic. It's just like GMOs, right? It creates a difficult dynamic for where and then when you want to apply the technology in countries where, clearly, we have a lot of support. There's lots to go here on this one. I do believe it's a fundamentally different situation than when we talked about GMOs, given the overall technology applicability across a broad array of sciences, including humans. I think there's a different dynamic here this time and, hopefully, some lessons learned in terms of what happened in the past. In the end, I think it's going to take a bit of time to sort out.

**Anuj Maheswhari**

My question is more around smallholders than emerging markets. Do you think, for a company of your size and scale, there is a viable and scalable business model to provide your cutting-edge products, whether gene editing, gene modification or crop chemicals, to smallholders around the world? How do you bring the benefits of everything that you're doing to the farmers in Africa, in India, in China, where the need for yield is the most? That's really where, in 10-20 years, the growth in acreage is going to come for a company like yours. Can you talk a little bit about examples and ways to do that?

**Liam Condon**

Let me start. I know everybody might want to chip in on this one. Absolutely, I believe we have a very important role to play. I think the experience has been, throughout all the years – and we've worked many years with smallholders – the challenge has always been to scale up. There has been no lack of pilot projects that benefit smallholders, but the problem is really addressing the core issues of smallholders. They are often not just related to the inputs or the technology; it starts much earlier with basic, good agronomic practices and training. It starts with access to microfinance, to microinsurance, connectivity to markets, transparency around what market prices are. There is a variety of issues that need to be dealt with for a smallholder ecosystem to be successful.

Our approach is one of partnership with others along the value chain, who can help create an ecosystem that is then scalable, in a specific geography, for a specific crop. Any offering great seed and crop protection is not going to cut it because, left and right, the pieces won't fit together. This is an approach that we are now taking with partners to try to scale across the board. It looks very different in different geographies but, for example biotech, there might be a sense in developed parts of the world that the latest and greatest biotech seeds may not be necessary for smallholders in sub-Saharan Africa. Maybe they can just do with some kind of conventional seed. Actually, we've got fantastic biotech that can help them with, for example, drought-resistant seed; for example, products to deal with fall armyworm that are not going to eat up the crop, once it arises. This is something that, again, we cannot fall into the trap of just giving wonderful technology; we've got to set up an ecosystem and that will take some time.

Our commitment to enable 100 million smallholders is a long-term commitment. I see this personally like our investments in R&D. We do not expect an immediate, short-term return. The way I look at this is: we are basically investing in a new generation of customers, and we've got to be in there for the long term. We're going to be trying different things in different parts of the world, experimenting, learning fast and moving forward, but always with the goal to scale up. That's in essence the approach.

**Mike Stern**

If you're going to think about empowering or helping 100 million smallholder farmers, you are not going to connect with them from a sales team; you're going to connect with them digitally. You have to. We're seeing that today with smartphone adoption in these areas. Within climate, we have a smallholder pilot going on in India, called FarmRise. Mark Young's here; he's our chief technology officer and head of product, and he's running a programme that is our first example and test into how we can go ahead and connect with a broad number of smallholder farmers and provide them information that makes a difference. The information that we're beginning to provide them is agronomic information, which again is a communication tool through a smartphone; a collaboration platform, so they can actually talk with other farmers, which is really important; and market and price discovery, both to make better decisions about what crop they'll plant and, of course, where they'll go ahead and sell the crop. Mark's going to talk about that this afternoon. I encourage you to talk with him about how we're thinking about it.

The key here is that digital connectivity is going to be the way to help drive agronomic improvements and market improvements, in this area. We're very engaged in Asia. In fact, I had a big meeting on this in Singapore, just a few weeks ago. We're excited about how we can think about bringing these digital pulls.

**Bob Reiter**

The only thing I'd add is I'm a believer, if we have the right innovation that can have the impact there, that there is a path. Right? We've got some good anchor points. We have a very effective and nice corn seed business in India, as an example, which is doing very well. We're using all of the same capabilities we use to drive germplasm improvement in the US. We have the same tools and capabilities to apply to places like India. We have a hybrid rice programme there that's very effective, so we've got these good anchor points. We have a history where we've brought innovation into geographies, even including biotechnology. Where we have the ability to be able to bring in technologies, grower uptake is very strong, if it creates the right value proposition for the grower and for us.

I still fundamentally believe there's going to be a bit of a political shift there, because Asian countries recognise that they've got a huge growing population to feed, and they want more self-dependency than ever. Fundamentally, I see some shifts occurring. Just look at the seed industry in China, for example, recognising that they've got to consolidate that down because they absolutely have to drive more innovation on to the farms. I just think there are also these macropolitical things that are going to occur over time that can also help benefit and put some tailwind into this dialogue. If we have the right innovation and it's applicable, there's definitely a path there.

**KC Arikatla, Goldman Sachs**

It's a very super-long-term question but, given we're discussing R&D in the future, I'll ask it anyway. If plant-based meat substitutes were to become more of a mainstream thing, how do you see it impacting your business?

**Bob Reiter**

Obviously corn and soy, one of the big elements of how they're consumed today is into meat production, through chicken, hogs and beef. That's kind of a big driver. One of the big drivers is population growth and then the second driver of that is protein consumption, as you see people moving up, in terms of how they consume their calories. The alternative protein space is really interesting. It's got a long way to go and we'll have to see how it affects things.

I want to come back to one of the things. Ultimately, as those alternative protein opportunities grow, one thing that they are dependent on is they are dependent on amino acids and carbohydrates, to be very clear. When they scale, they're going to have to source to efficient sources of carbohydrates and amino acids, which ultimately is going to bring them back to the row crops. Today, maybe you want to go ahead and source peas as your protein source. We're not going to scale peas to take 10% of the alternative market and see it.

I mean, the big open question in alternative protein really, ultimately, is the efficiency question. How efficient are these systems really going to be? Are they actually going to be more efficient conversion protein creators than meat production? In answer to that, candidly, I don't know. They like to compare themselves to grass-fed beef today, which is the most inefficient one, but the reality is most protein consumption, particularly in the geographies that are driving continued meat consumption, is chicken and hog based. Chickens are bloody efficient. We'll see how it goes. I think that we'll see, ultimately, as these things scale and become potentially more predominant in the market, more shifting of the grain sources into those. We'll see how they fit into the overall dynamic of protein consumption, on a global basis. It's something to keep an eye on, and we certainly are.



One of the things we're also looking at is, for some of those, in order to be alternative protein sources, they are sourcing different types of crops. That also could create opportunity for us, being a company that is a plant-breeding company in many ways. We're also looking at how we want to potentially play in the market a little differently, if those crops become more and more important as a sourcing opportunity. There's lots to happen in this space.

### **Oliver Maier**

Thank you so much. Thank you, Bob; thank you, Liam; thank you, Werner; thank you, Mike, for participating in the Q&A session. Thank you, guys. With that, we end our webcast at this point in time.

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<http://www.ubiquis.co.uk> / [infouk@ubiquis.com](mailto:infouk@ubiquis.com)**

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