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EXECUTIVES

Debra King
Senior VP & Chief Information Officer

Gregory R. Friedman
Executive VP & CFO

James C. Collins
Chief Executive Officer

Judd O'Connor
Vice president of the North America Region

Megan Britt
Investor Relations Director at DowDuPont

Neal Gutterson
Senior VP & Chief Technology Officer

Rajan Gajaria
Executive Vice President of Business Platforms

Sid Gorham
CEO of Granular & President of Corteva Digital Business Platform

Timothy P. Glenn
Executive VP & Chief Commercial Officer

ANALYSTS

Jeffrey John Zekauskas
JP Morgan Chase & Co, Research Division

John Ezekiel E. Roberts
UBS Investment Bank, Research Division

Mark William Connelly
Stephens Inc., Research Division

Steve Byrne
BofA Merrill Lynch, Research Division

Vincent Stephen Andrews
Morgan Stanley, Research Division

ATTENDEES

Unknown Attendee

Presentation

Megan Britt
Investor Relations Director at DowDuPont

So good morning. We're ready to get started here. I'm really thrilled to welcome you to Johnston, our global business center here for Corteva Agriscience. So for those of you who don't know me, my name is Megan Britt. I lead the Investor Relations function for Corteva Agriscience. And we've got a really exciting agenda here in terms of our management reviews for this Investor Day.

I have a couple of comments just from the outset. First of all, throughout the presentation today, we're going to make forward-looking statements. As you know, those are subject to risk and uncertainty. We've also used a lot of non-GAAP measures throughout the presentation. We provided reconciliations for those measures in the appendix of the materials. Those are posted now on our Investor Relations website in the appendix just for reference.

So I want to give you a flavor of the agenda for today, just a little teaser on what you're going to hear from our team today. So this morning, we're going to open with Jim Collins, CEO-elect for Corteva. He's going to walk you through really, I would say, a look at how we performed so far, some of the financial results, some of what we talked about around the first quarter. But he's also going to spend some time on our capital allocation strategy and really thinking about kind of the industry overall and our opportunities to grow as an organization. He's going to be followed by Greg Friedman, our CFO-elect. Greg is going to give you a reconciliation between our divisional results to our stand-alone financials as we anticipate becoming a public company. So that's going to be a critical piece of the overall conversation today. I want to spend some good time on that.

Then we have a slate of leaders with us that we'd like to showcase to provide, I think, an additional deep dive on some critical aspects of Corteva. So we have Tim Glenn. He is the Executive Vice President. He's our Chief Commercial Officer. He's going to give you a view on how we'll be able to grow regionally in a number of different markets. He's joined today by Judd O'Connor. Judd is our business President for the United States. And as you guys know, we've had some recent items kind of appear in the United States that we're going to spend some time talking about, but we've got a really strong model in that market and a lot of, I would say, growth in the future ahead of us. And so Judd's going to give you a view of that.

He's going to be followed by Rajan Gajaria. So Rajan is our Executive Vice President. He's in charge of our Business Platforms. There you are, finding you in the room today. So Rajan's got more of our mid- to long-term look, really strategically where we're headed. He's going to give you a deep dive on our Seed and Crop Protection segments and really some of the growth aspects there that we'll want to highlight.

He's joined by Sid Gorham, who's really the business President for our digital platform. So Sid's going to give you a view of what we have going on with Granular and even some things beyond that in terms of how we're looking at wiring that into the organization overall.

Debra King is with us today. So Debra is our Chief Information Officer. So she's going to give you some views of what we're doing with ERP, really setting up a backbone across the organization that's going to help us better digitize our overall Corteva team.

And then our last speaker will be Neal Gutterson. He leads our R&D organization. He's going to talk about our innovation engine, and then he is going to introduce the tours later on today. And for those joining us on site, we have some very exciting innovation tours planned for the afternoon.

So with that, I'm going to turn it over to Jim Collins.

James C. Collins
Chief Executive Officer

Great. Thank you, Megan. Thank you.

All right. Good morning, everybody. Appreciate the group that is here in Johnston, and thanks for so many folks that have -- joining on the phone here today. And I think as Megan said, I believe we've set up a really informative session for you today and is -- I've spent a lot of time with many of you here over the last 3 years as we have been talking about the company that we're building. As you all know, I like nothing to do more than to talk about the great things going on here at Corteva.

So in just 22 days, on June 1, our 3.5-year journey of bringing together these 2 world-class organizations will reach another very significant milestone, and that will be the spin. And while I believe the work that we've been doing is really never complete, we continue to fine-tune and adjust the structure, I couldn't be prouder of how far we have come as a team and an organization. And you can feel that momentum. And we'll talk about the momentum that is behind the business here going forward.

As Megan said, I'm pleased to be here with a number of the members of our leadership team who have been absolutely integral to the design of this new organization from the very beginning. So it's not a new group. We've been working together for 3 years. And so at spin, at launch, this team has already got a routine together and a discipline together -- of working together.

I think Megan described the agenda well. We're going to provide you some progress updates. We're going to provide you, I believe, another level of transparency. And we're also going to begin to talk about the regional approach that we're taking with folks like Judd and just how well those teams are executing.

So I hope that by the end of the day, you'll come away as confident as I am about the plans that we've built, about the team that we have here and about the potential and the opportunity for Corteva going forward.

Now over 1 year ago, we announced our new name, Corteva. We began to establish our brand in the industry. We established our set of values, both internally and externally, and I think the team has done just a solid job of establishing this master brand in the marketplace.

And here we centered our company on this new purpose: Putting our customers, our farmers but also societal needs at the absolute center of everything that we're doing. We're working hard here to create a different kind of ag company and one that is working hard every day to manage both of those needs.

We're guided by a set of values that you see listed here. It's about being bold, taking strong leadership steps. It's about being collaborative and growing together both internally and externally. It's about being curious. You're going to hear Neal talk a lot about that. And all of these values are founded on a very strong foundation around transparency, business ethics and safety both of our employees every day but also the environment that we operate in.

Now the spin gives us this unique opportunity to leverage the combined deep histories of the 2 organizations and the capabilities that we've developed over the years with a new mindset, right, a fresh, young approach, kind of an urgency. So I like to talk about ourselves as a start-up with 200 years of history and capability behind us so that on the day that we spin, we have instant presence in the marketplace in over 130 countries around the world, providing the right mix of seed and crop protection and digital solutions. We have a sales force that I believe -- we believe is the largest in the industry that reaches over 10 million customers a year. And so it's that connection, it's that scale, it's that presence in the marketplace that allows us to execute like no one else globally.

Now we really did take a clean sheet of paper to design an industry-leading operating model with -- starting with really our best-in-class cost structure, and then we mapped the best of both organizations into that new structure. So we didn't inherit one and tried to merge one into the other, we really did start with a new design. And it started with a focus on the customer, a sales and commercial team executing in the marketplace like no other. But we also backed that up with a very strong asset organization, a focus on projects and programs and a focus on the working capital deployed to support that team. So that's kind of what you have with Tim and Rajan, a strong commercial leader driving that focus on the customer every day; and then with Tim and then Rajan's supporting that organization with a strong focus on the assets and the working capital. And it creates a process that drives the health of the business forward.

We have this comprehensive route to market that when we put these 2 together, that really improves our presence in retail but provides a new cross-sell opportunity across all of the channels of seed, crop protection and digital. And you're going to hear Judd give you a few examples of that, especially what's going on with that Pioneer customer.

When we put these 2 organizations together, we wind up with a leading pipeline. And we've launched 14 new products just since we merged -- since we announced the merge. And that pipeline, those new technologies are enabling an entirely new revenue stream of licensing our products to others. And Enlist is a great example of that, and you'll hear Rajan talk a lot more about that.

Now our strong, disciplined, customer-centric culture has a discipline and a focus on executing to profitably grow the business as well. And that operational discipline is also driving cost productivity across. So 1 plus 1 here, as you can see from the chart and a few examples, really did equal 3-plus.

Now it's clear that our market is a lot more challenging out there today than it was 5 years ago. U.S. farm income levels are -- have been relatively flat, and that's primarily driven by these low commodity prices and some of the issues associated with the grain trade that we're all very much aware of. U.S. currency headwinds have also hit us over the last couple of years, and Greg will show you some of that more in our numbers here in a minute, but you add to that the severe weather events that have gone on here in the Midwest, and I think you all were very much aware of the temperature of the air when you got off the bus this morning. It has created some challenges for us in the near term, and I'll come back to that more in a little bit.

I still believe, and I think the industry does as well, that the long-term grain demand, especially for corn, remains incredibly solid. And some of these short-term adjustments are inevitable, right? Acres will shift, prices will adjust and we will adjust and control the levers that we have.

So specific to our 2019 reported sales, we're going to be about flat with organic sales growth, price/volume of about 1% to 2%. But if you exclude the U.S., we have some very strong growth occurring in other regions around the world, and I'll show you some examples of that on the next chart.

Now our pipeline is delivering, and it's delivering above our expectations. And you're seeing that in our first half results, but you're going to really feel it in our second half results here in 2019. And that's leading to an improved mix, which leads to better margins.

The cost synergies are delivering. You can see it again in our numbers, and they are also helping to support our EBITDA improvement in light of all these other challenges that we were facing. So we're working hard to accelerate those synergies every day to pull some of those back-end synergies in 2020 into the second half of '19, and that's a part of our second half story.

We are launching some additional productivity projects in both of our Seed and Crop Protection areas, especially in our supply chains, working on the inventories and our cost of goods areas.

So I believe we're executing very well on the performance levers that are in our control, and that's helping us to weather some of those other issues out there that are not in our control.

So as you all know, we announced our first quarter results here just last week. And remember that in many parts of the world, our direct delivery model to the customer means that we recognize revenue when we deliver seed to that grower.

So these severe weather-related impacts that we've talked about a minute ago in the western Corn Belt drove a considerable amount of our revenue out of first quarter into second quarter. Now we expect to recover essentially 100% of that. And our deliveries already show that, that within 2 weeks at the end of the quarter, we were already back to equal to last year and were trending slightly ahead of that as we get into the balance of this season.

So if we separate the impact of North America, you can look at our Crop Protection segment over there on the left-hand -- on the right-hand side of the chart, and you can see that sales were up 11% and our Seed segment was up 5%. Now those were on an organic basis. But that means prices and volumes outside of the U.S. were growing quite nicely.

And if we exclude just 2 states in the United States, Iowa and Nebraska, we would expect U.S. revenues to be up as well on an organic basis.

So looking at a few of those other regions, you can see Latin America up 7% on strong insecticide growth. We basically are selling out of a really important product that we have there in our Spinosyns. Europe, up 8% on a strong fungicides growth -- the newest, hottest fungicide in that market, ours, is a product called Zorvec -- and a new herbicide for cereal crops with Arylex. And then Asia Pacific up 14%, and that's strong insecticide sales growth again with our Spinosyn but also 2 really hot new products in the rice market: Pyraxalt, an insecticide for the brown plant hopper; and Rinskor, a new rice herbicide there. So the Asia Pacific team really executing well.

So on the earnings call, we confirmed our 2019 guidance with some minor adjustments to the first half and second half. And we have confidence in our ability to deliver on those commitments.

And the first half adjustment included some lower planted acres that we would likely expect due to some of the flooding that we saw in places like Nebraska and Iowa, and now we're seeing some additional flooding even south of here as the Mississippi River kind of takes up some of that water.

We expect to see some shifts to less profitable crops. The shift from corn to soy will affect us a little bit in the first half, but also we might see some shifts to some short-season maturity corn, which are less profitable for us. I still believe growers want to get a corn crop in the ground this year. If you look at the economics right now, corn prices are holding up a little better than soybeans.

And then we saw a loss of some of those early-season Crop Protection applications, the burn-down applications that we would normally have received as well as our nitrogen business, which is essentially we are the main player in that segment and we probably lost some of those breaks. So we did some replanning and adjusting for a strong second half.

Now we already had a strong second half plan, so the adjustments that we made only added about $80 million of EBITDA to that second half plan.

So where did we get that from? Well, it started with accelerating those cost synergies that we've talked about, finding ways to just move those forward, maybe execute a little quicker than the original plan had shown.

That pipeline, as I said, is delivering. We challenged our teams globally: How do you hit the gas even stronger to deliver those pipeline products more aggressively? We will see improved margins on those products as they start to deliver. And then I mentioned being sold out in a few products. So we have some price opportunities for those particularly demand-challenged products that are out there, and that's primarily in our insecticide space.

And then we're going to drive another level of productivity projects. Just as I look forward, keeping things tight, keeping the ship rigged up really tight going into the second half of '19 and the start of 2020 just seems to make really good sense to us. And so the team has started to come up with a number of other projects that are aimed at delivering in the short term, in the second half.

Now all of these numbers are on a divisional basis, and I know we have given you a lot of numbers over the last couple years. So Greg will work in his presentation to really translate all of this from a divisional basis to a stand-alone company basis, and then we will anchor on those set of numbers going forward.

So I do get the question a lot: Why are you so confident in this 2019 plan? Well, remember that by the end of the first half, in the end of June, we've delivered about 90% of the EBITDA for the full year. And so there's a lot of things still within our control in the second half, especially what we're doing around spending and new product launches. And so sitting right here today with a couple of months to go, I feel good about that half number. And so we've got good visibility of what that full year could look like from where we sit right here today.

So let's shift gears and talk a little bit more about the future. We are making progress on those higher-level priorities that we set out for you in our November Investor Day, and you can see them here. And we have a few specific examples under each one of those that reinforce that we are committed to delivering on these priorities. And I think you'll see it throughout the day. You'll see the presentations. You'll see a linkage and an alignment on these priorities as well.

Now down below that, you can see that we've aligned on a set of KPIs that we will report out to you on a regular basis. And so I think about these kind of from the left-hand side to the right. It really first starts with growing the business. Organic growth. And we're committed to 1% to 2% organic growth on a year-over-year basis.

And next, it's about maintaining that best-in-class cost structure. So we'll establish benchmarks that we will report out to you on these different elements of our cost structures, and Greg will spend a little more time on those different cost buckets as we go through.

So both really good growth and managing your cost leads to that third KPI around EBITDA improvement. And so we would expect an EBITDA margin improvement of somewhere between 50 and 150 basis points per year, and again, we will report out on that metric.

And finally, and it's a metric that we have rallied around as an entire organization around ROIC. And we're establishing that as a key metric, and we will be leveraging that metric into our management compensation programs going forward. And so it's not only about a focus then on earnings, it's also about a good, prim focus on the working capital that we're deploying to drive the business. So the goal would be to drive ROIC into that mid- to high teens percentage point over the planning horizon.

So taking those 5 for a moment. Like I said, I think it all starts with demand. At our core is our focus on our customers and our ability to create demand in the field. So knowing how our customers farm, showing them our products in their operations, using our unparalleled access to that customer to really showcase our products. And you can see here a number of examples where we do live demonstrations on their farms, comparing their standard practice to our new products. And you get these amazingly visual results, and we can show them with some pretty special tools that you're going to see on the tour later today how we're driving productivity and how that leads to better profitability. And we can show them that standing right there in their field. And you know what? Based on what you see here, based on my experience, I think we do this better than anyone else in the industry.

So then, it's that second area that we committed to around capital productivity. So as we begin to now settle our capital structure and align around the financial policies, we're returning to this focus on delivering ROIC improvement as a way to measure that. So it starts with maintaining some financial flexibility committed to our business model about lending and financing growers. So it's about maintaining that A- credit rating so we can maintain access to short-term capital through the cycle, and Greg will show you a little more detail on that.

We are committed to growing cash flows, and that's partly to fund the $2 billion of growth investments that we make in CapEx and in R&D and our digital investments.

We're committed to a competitive dividend, and it's a dividend policy of about 25% to 35% of net income, which will be about $400 million in 2019.

We are committed to returning excess cash to shareholders. And we do anticipate that our Board will approve a share buyback program shortly after spin, and we'll give you more on that as that occurs.

So with all of that in place, then it allows us to begin to take actions to drive this improvement in ROIC. And it's a tough metric to calculate today until after we spin and get our balance sheet all settled down, but we would estimate that we're at about 11% ROIC today, and our goal would be to drive that through the mid-to high teens over the planning horizon.

So you can see that we have the opportunity now, the framework or the case to begin to drive that. So driving working capital productivity will be important.

The third is about innovation. You're going to hear a lot more about that. I mentioned -- I think the best metric here is we have 14 new products that we have launched since merge, Enlist and Qrome being 2 big ones on the Seed side. You can see number of chemistry products that Rajan will go into a lot more detail. And I'm particularly excited about the work that we're doing in the digital space with Granular Insights, a new offering, and soon we'll go into a lot more detail on that.

So I mentioned our affordability. Establishing that from a cost perspective was something we started with. We designed a new organization, and then we mapped ourselves into that. And so this led to some significant reductions that are highlighted at the top of that chart.

So we sit here today with a 20% headcount reduction from where we were at the beginning of the merger, 1/3 of our Seed sites, half of our commercial offices around the world reduced, 1/3 of our R&D research field sites, 2 large Crop Protection manufacturing locations and a number of other units within our manufacturing footprint that were optimized. All of those steps were a huge part of us delivering on the $1.2 billion of cost synergies that we've kept you appraised of.

So now that we have that asset footprint optimized, and we have that organizational structure and that operating model in place, we can now go to work on creating process harmonization that allows for us to even more efficiently drive growth.

So we're talking today about announcing an additional $500 million in operating EBITDA improvement from additional productivity actions over the next 5 years. And we'll begin to talk more about those projects, and I'll report out on that. We already have good line of sight to those projects. We believe we can begin to deliver some quick wins here in 2019 to support a strong finish to the year, and a number of those projects will begin to deliver in 2020 going forward. So that piece along the bottom is new, and we will, certainly, be sharing more information about that initiative.

And then finally, as I mentioned, I couldn't be more excited about the work that we're doing in the digital space. Now this digital transformation is much more holistic than our external-facing business that you'll hear about here with Granular. It actually includes 3 really important strategic pillars.

It is the external piece through Granular, selling Software as a Service and helping farmers be better business managers and be better growers. But it also includes all of the great work that we're using digital for internally in our R&D and seed productions. And you're going to hear a lot about this on the tour today. But there's also an enterprise piece to digital, right? It's how we move data around, how we communicate with each other, how we communicate with our customers. And you'll hear Debra tell you a lot more kind of about that centerpiece.

So it is about driving cost reductions. It's about cross-selling opportunities. It's about driving our new product pipelines and our new product revenues even faster using some of these digital tools. And it's about targeting additional earnings because we're a more efficient and a more digitally flexible organization going forward. So we will certainly keep you up to date on that. The first installment here that Debra will share with you is the convergence of our ERP projects.

So all of that, I believe, adds up to a tremendous opportunity for Corteva and one that will support shareholder value creation. It starts with this unique route to market and this expanded access that I talk a lot about. It's that pipeline not just of products but of solutions. It's about attaining and then maintaining that best-in-class cost structure and keeping that balanced portfolio of seed, chemistry and digital and utilizing that global market presence that we have. It's about building a strong team and a strong culture that is focused on that customer first. All of this starts with demand creation. And then finally, this exciting area that we're now embarking on about becoming a more digital organization. And you put a foundation under all of this around cost and working capital productivity as part of our mindset every day.

And so I think it creates tremendous potential. And I believe -- I hope at the end of the day after you see all of the other pieces of this coming together that we have to share with you, again you'll become as confident as I am that we have the right winning strategy here, and we've got all of the pieces in place today to go begin to deliver.

So with that, let me turn it over to Greg. Thanks.

Gregory R. Friedman
Executive VP & CFO

Thank you, Jim, and thanks, everyone for making the trip out, and thanks to all that are on the phone or on the webcast.

I'll start off today talking about our reconciliation of our DowDuPont divisional financial statements to our Corteva stand-alone financial statements because I know this is a big question that a lot of you have had.

On the left side, you see the reconciliations that we've provided with our Form 10 filings for 2016, 2017 and 2018. And on the right side is our estimate for 2019. So at the top, we start off with our divisional operating -- segment operating EBITDA for DowDuPont of $2.8 billion, a number that Jim talked about, a number that we confirmed last week at earnings and yet again this morning in our press release.

The takeaway from that, spin adjustments. So spin adjustments represent excluded businesses. And for us in 2019, excluded businesses are predominantly the telone product line. Now the telone product line has stayed with Dow, and Corteva is the exclusive distributor for telone going forward. So we're reducing the margins on that product line down to a distribution-type margin.

We also take out as part of spin adjustments nonoperating pension. So nonoperating pension costs were -- costs and benefits were included in segment operating EBITDA. But on a stand-alone basis, they're considered nonoperating because our plans are frozen, and we are no longer accruing any service.

And then finally, you've got some other adjustments, and these other adjustments are accounting adjustments to bring the accounting of Dow AgroSciences in line with our Corteva accounting principles. And you add up those 3 elements, and they add to about $174 million, and those mirror what we estimated in 2018.

The next element are stand-alone costs. So stand-alone costs are comprised of functional and leverage costs and corporate costs that were not included in the divisional operating EBITDA line at -- under DowDuPont. Now these are costs that we're inheriting from our parents, and we're bringing with us to stand alone. And again, that -- they total about $478 million, and we're holding that number constant with our 2018 results as well.

But from that, we have -- as Jim has talked about, we've implemented a number of synergies and productivity actions. And so we estimate for 2019 the impact of those cost reductions will be in the range of $50 million to $150 million. That will provide a Corteva stand-alone EBITDA for 2019 of $2.2 billion to $2.3 billion. Now that $2.2 billion to $2.3 billion is a 5% to 10% increase in expected operating EBITDA for 2019.

So I'll take a minute here just to talk about the stand-alone costs. Stand-alone costs include about $140 million of corporate costs. And we've said that we would maintain corporate costs at or better than the best-in-class standard of 1% of sales. So that's a commitment that we've made. And you can see that we're already there in our numbers.

And I'll just mention that with functional and leverage costs, this is an area where Jim talks about getting to a best-in-class cost structure that we as a management team are squarely focused on. We're very focused on reducing those costs, and we're committed to reducing those costs not just this year but over time.

Our big efforts to do that are included in the new productivity programs that Jim highlighted, but the biggest contributor that I foresee helping our leverage and functional costs will be the implementation of an ERP system.

We brought into Corteva 3 disparate IT systems from 3 different businesses. And there's a lot of complexity in the system today that has added costs. So the big opportunity that we have here is with the ERP implementation, which we've already begun in 2019. And Debra well provide some details on that going forward.

So a couple comments on our guidance for 2019. On the left, you see our divisional guidance. And on the right is our stand-alone guidance. There's really no changes here between the 2 columns except for the last 2 items: EBITDA growth of 5% to 10%, as I mentioned before; and operating EBITDA margin expansion of 50 to 150 basis points.

So moving on to 2019 sales guidance. Let me walk through this chart here with you.

You can see in the green -- the green reflects our above-market organic sales that are driven by new products but also pricing that we're able to get on these new products as well as supply-constrained products.

But in the red, you see our headwinds. Currency is a big headwind. And then you -- then we have the severe weather in the United States that have resulted in a -- or are resulting in a mix in our seed products to less-profitable crops like soybeans or shorter-maturity corn and also the missed crop protection applications that didn't occur this spring that would have normally occurred.

In addition, we have our North America seed brand rationalization. Judd will talk a lot about that in his section, but this is an investment in 2019 that provides for a longer-term benefit, as we'll talk about a little bit later.

And then finally, we did have some significant timing shifts from the first quarter of 2019 into the fourth quarter of 2018. Those were driven by 2 things. First, the early safrinha season in Brazil through sales into December versus January, as it normally would have been conducted in January. The other is related to some early sales in North America that were really driven by the market facilitation payments that farmers in the United States received from the government in December. That freed up some cash and allowed for early shipments to occur in North America.

That all combined gives us projected organic growth of 2% for 2019.

Now moving on to operating EBITDA guidance. So again, on the green parts of the chart here, you can see our margin expansion from product launches, pricing, accelerated synergy delivery that Jim talked about and productivity. We also have some growth investments, specifically launch costs for our new products but also the North America Seed rationalization. And then finally, we have some headwinds. Currency is a big headwind. Severe weather that I mentioned. Higher input costs are a big driver for us as well. We source a lot of our active ingredients from China, and the costs on those active ingredients have been rising over the last year. But specifically, in the last half of last year is when we started to see the impact. The good news on that one is that we will be lapping that impact. We'll also be lapping the impact of currency in the second half of the year as well.

And then finally the timing shift. Now what's interesting about this chart is if you look at the 2 red bars that are labeled headwinds and currency, and you think about the things that are driving those 2 bars, currency, which is a global issue; weather, which is a market issue; higher input costs, which is a market issue; and timing, which is also market driven, if those 2 bars were gone, the outlook for 2019 would have been quite different. But that is agriculture, and that's the market we play in. And our forecast is here for 5% to 10% EBITDA growth in 2019.

Moving on to our stand-alone financials over the past several years. You can see from our Form 10 we've shown our sales from 2016 to 2019 on the left and our EBITDA -- operating EBITDA on the right from '16 to '19. Since the merger close, operating EBITDA has grown at a compound annual rate of 5% to 7% from 2017.

So moving on to our midterm financial targets. That's a couple years beyond 2019. On the left, you'll see that we're expecting top line growth -- top line sales growth of 3% to 5%, which incorporates market growth of 2% to 4% or net above market growth of 1% to 2%. And on the right-hand side of the chart are our expectations for operating EBITDA, which is essentially we're expecting operating EBITDA to grow twice that of sales with EBITDA margin expansion of 50 to 150 basis points per year and Corteva operating EBITDA growth of 6% to 10% per year.

And then finally on the bottom, a quick comment on free cash flow conversion. We're very focused, as Jim mentioned, on driving productivity into our working capital. That's going to help us with free cash flow conversion. We expect to improve to above -- to exceed 50% of EBITDA in free cash flow conversion specifically beyond 2019 as we get past all of the integration and separation spending.

Moving on to our capital expenditures. We'll continue with our disciplined approach to capital investment. Capital expenditures would be limited to depreciation plus CapEx to achieve synergies and savings as some of our 2019 CapEx spend includes CapEx associated with our ERP project. Now our CapEx is comprised of about 40% of run and maintain, that are necessary to maintain our assets and make sure that we operate our assets safely. But 60% of our assets -- or, I'm sorry, 60% of our CapEx is focused on growth and growth projects. And we validate that each project that we green light provides a good return based on its profitability, its earnings and the risk. And this approach will ensure that we continue to improve ROIC and enhance shareholder value.

I'll take a minute here and talk about seasonality. Seasonality is a big component of our business and it's a big driver of our capital structure. About 80% of our Seed sales occur in the first half of the year, and about 2/3 of our overall Corteva sales occur in the first half of the year. Usually, the first half represents, primarily the North America -- or Northern Hemisphere, which is primarily North America and Europe. And the second half of the year shifts to the Southern Hemisphere, which, in our case, is predominantly Latin America, specifically Brazil and Argentina.

And our working capital needs, as you can see on the right-hand side, are funded by short-term debt within the year and are largely paid down by year-end after the North America harvest is -- collections are made.

So given the seasonality of our business, liquidity is an important component of our capital structure, and you can see on the chart on the left, our sources of liquidity. We have $2 billion, $3 billion revolvers, one that is established to provide a backstop to our commercial paper program. We utilize commercial paper for intra-year borrowings as an important source of liquidity.

And on the right is our debt profile. We will only have about $100 million to $200 million of financial debt. Our seasonal borrowings are needed, as I mentioned, to maintain our working capital needs, and this balance grows to about $4 billion over the course of the year.

And our capital structure was specifically developed to provide and support -- provide support for our unique business model and our closeness to the customers. So we are a part of our customers' business with our flexibility in our working capital, and that's a key component that we use with our working capital during the year. And with that, we're targeting an A- credit profile to support this differentiated business model.

So just a quick couple points here on achieving our targeted capital structure. You probably kept up to speed with all the work that we've done to issue debt and then delever out of Corteva. That process is in play -- or has been continuing since last fall, and we'll be complete with that before we spin by the end of May.

So with that, let's move quickly to pension because pension is an important part of our capital structure as well. It's part of the -- an important part of our capital structure specifically because the credit rating agencies add the unfunded pension obligation to our financial debt when they look at our overall debt portfolio.

Now as I mentioned before, the U.S. pension has been frozen and no other service costs are accruing, and all future costs and benefits will be considered nonoperating. Now future costs and benefits are predominantly driven by discount rates, asset returns and also actuarial changes.

The annual cash flows related to the pension are expected to be about $200 million to $300 million per year.

A couple more comments on some additional modeling guidance that you'll see here. We'll leave this with you. One comment I just want to make. We gave an estimate for depreciation, but if you're modeling cash flows, you're going to need depreciation and amortization. Our estimate for depreciation and amortization for 2019 is about $1 billion.

So a couple of comments here on synergies. I've shared with you before the plans to deliver synergies in the financials, and you can see that we're well on the way in 2019, and we actually increased our synergy estimate by $50 million to $350 million in 2019.

Moving on to our plan to spin. Yes, we're very excited to announce just a couple of days ago that our Form 10 has been declared effective by the SEC. And we also announced that our exchange ratio is basically, 1 share of Corteva for every 3 shares, of DowDuPont or a 3-for-1 exchange ratio.

We expect when-issued trading to commence on May 24, which is also our record date. And we expect regular way trading to commence on June 3 -- Monday, June 3, after our June 1 spin.

So a chart you saw before here with respect to our 5 priorities, and I just want to reinforce the comments that Jim made that this team is committed to delivering on these 5 priorities. We're committed to doing that through ROIC improvement and disciplined allocation of capital, executing the launches and the ramp-ups of our new products that we've committed to, synergy realization, working capital efficiency, continuous productivity improvement, maintaining a healthy balance sheet and rigorous review of our uses of cash to fund growth.

And along with our focus on shareholder value creation, our focus is primarily in 3 areas: growing sales, expanding EBITDA and disciplined investment. We will strive to be a shareholder-friendly company focused on delivering value and returning excess cash to shareholders.

With that, I'll turn it over to Tim Glenn.

Timothy P. Glenn
Executive VP & Chief Commercial Officer

All right. Thank you, Greg, and good morning. It's my pleasure to have the opportunity to talk to you about our commercial organization and how we're positioning ourselves to win in the market.

So now you've seen this slide for the third time, but this is our priorities. And what I want to emphasize is from a commercial standpoint, our commercial organization, the priorities we have and our KPIs are directly tied to the Corteva shareholder value creation priorities. My team understands them, and that's how we operate.

And 3 important points that I want to make here. First thing is that we are positioned to continue to deliver above-market growth, and that's going to come from a combination of new product launches as well as market share and share value increases due to improved routes to market.

Second point is, we're committed to improving the quality of our business, and that's been going to come in the form of margin improvement in terms of improving our product mix as well as capturing value through pricing and also working capital improvement, primarily through inventory management and also aggressive management of receivables.

And finally, we are -- we have established ourselves with the scale and footprint necessary to serve farmers the way that they want to be served, through multiple channels.

Jim gave you a quick rundown of some of the factors that had been impacting our business over the course of the last few months and as we look forward into this quarter, and I'll do a little bit of -- more of a deep dive by region.

I want to start with North America. And it seems like over the past year or so, we spent a lot of time talking about weather, and we spent a lot of time talking about trade. And when you think about the impact of weather, if you had a window seat as you flew into Des Moines yesterday, you probably saw that it was a little muddy, the rivers were a little swollen, and things were still brown outside and not a lot of green visible as you arrived. And clearly, we -- even though conditions have improved, we're lagging where we should be at this time.

And clearly, even though conditions have improved, we're lagging where we should be at this time. And to give you some idea on the planting report -- planting progress report that came out on Monday, we are roughly 1/3 behind corn planting progress where we would have been a year ago at this time. And we're about 50% behind where we would have been from a 5-year basis.

The good news is we still have several weeks left, so the planting window hasn't closed. We've got several weeks, but we do need conditions to improve. As Jim said, farmers are motivated to plant corn. And so as soon as conditions allow, they will be -- they are ready, and they'll be out in the field and begin to close or plant that crop. And the capacity we have to plant quickly can close that gap fast.

Around trade, obviously, we don't have a lot more insight versus what's been out there for the last number of weeks and still, there's uncertainty. What I would highlight is, at this point in time, farmers have largely committed to the crops that they're planting. What has changed over the last few weeks is that it used to be -- trade was primarily U.S. soybean issue. It's now extended into Canada, and the most important crop in Canada is canola. And today, canola has been severely impacted by trade issues with China. And so it's beyond just U.S. soy. But by and large, farmers have made their decision at this point in time, and we don't expect a resolution or continued lack of resolution to materially impact what goes in the ground this spring.

When we think about Latin America, as Greg said, our business in Latin America tends to be more biased towards the second half of the year, although that can change a little bit depending upon the timing of the safrinha season. We've had relatively stable currency markets, and currency has been the story in Latin America for the last year or so. It's been relatively stable over the last few months, and although it seems to be trending a little bit weaker here in recent weeks. But farm conditions in Latin America have been solid. Definitely, farmers have benefited from the trade dispute between the U.S. and China, and that's created some favorable economics for farmers there. And as we look into the second half of the year, I would say we're in a relatively favorable situation in terms of agriculture in Latin America.

In terms of Asia Pacific, our business is heavily biased towards the second half of the year. Right now, we've got an issue that's not necessarily going to impact production or agriculture in Asia. But that African swine fever question certainly could have some impact around the world relative to the flow of grain or demand for grain or oilseeds. The other factor we're watching closely in Asia Pacific is we're in an El Nino year, which tends to create more likelihood or increased likelihood of droughty conditions across Asia, especially the ASEAN countries. And we've actually seen that express itself in Philippines and some of the other early markets. So something to look at there.

In terms of Europe, Middle East and Africa, Europe was a bright spot, and conditions were very favorable. And so the season got off to a good early start, and that was reflected in our results for the first quarter. Good, strong start to the season in Europe. Africa, and we expect that that's going to continue on here through the growing season. In Africa, Middle East, the business is heavily weighted towards the second half of the year. Much of Africa is coming off of a drought year in 2018. It appears conditions are more favorable as we look forward, but still some time before that. But again, improving conditions are expected across Africa and Middle East.

So in agriculture, we deal with the short-term issues. We deal with markets. We deal with weather, but there are long-term trends that are also impacting our business as well. We see trends around farmer consolidation. And this is global, whether we're dealing with smallholder farms or we're dealing with large, more-developed ag economies. And what that consolidation has led to and continues to lead to is not just bigger farms, but also those farms tend to become more professionalized in terms of how they manage their operations. And when I say professionalization, they tend to manage the details tighter as they grow and professionalize.

We also have challenges around resource scarcity. We hear a lot of things around water. We hear around the cost or availability of labor, the availability of capital to make the necessary investments to grow forward. And what we've seen in agriculture over time, and what we continue to see going forward is it's technology that help solve these challenges. And farmers around the world are faced with many of the same issues, many of the same challenges. And again, whether it's a large farm or a small farm, in a highly developed economy or a developing economy, technology is going to help solve those challenges.

In a recent survey in the U.S., we asked 1,500 corn farmers, customers and prospects, what their expectations were for their corn crop in the next 3 years. Half of those farms that we surveyed expected their corn yields to be over -- to average over 200 bushels 3 years out. And that would represent somewhere in the neighborhood of about an 8% yield increase on average over where they were today. And the only way that that's going to happen is through the use of technology and managing those details on their farm operation more intensively.

So we believe, obviously, that technology is critical for farmers. And we see it every day, and we continue to believe that farmers are willing to pay for technology that adds value to their farm. And I will emphasize that: adds value to their farming operation. We believe we're set up well at the market level with a broad range of genetics and traits, broad crop protection portfolio and the ability to deliver agronomic information and tools, that are necessary for farms to make these improvements and to get the most value out of those technologies and innovations.

A little snapshot of our geographic footprint here. And the point I want to make here is that we're well established in each region. We've got scale, and we've got our footprint set up to really do 3 big things: The first thing is we can develop technology, develop products specific to our local markets. We have the ability to supply our markets in a cost-efficient and reliable way, and we have the ability to create demand and to serve farmers in appropriate channels for the markets that exist.

We operate our businesses in an aligned approach. And when I say aligned, what I mean is that we operate our Seed and Crop Protection business in an integrated or aligned fashion. So my leaders on my team at the country level or below have responsibility and accountability for both the Seed and the Crop Protection business. And while we may operate in respective channels, different channels when we face the customer from a Seed or Crop Protection standpoint, those local leaders are thinking about the Corteva business and portfolio holistically and thinking about how they can deliver and drive the results better appropriate for Corteva.

I want to emphasize the fact that we have established ourselves in a comprehensive route to market, so I'll walk through the 4 primary routes that we use to serve our farmers. First is, I'll call it the high-touch Pioneer model. And so this would be the Pioneer sales rep model, premium product, premium service, strong relationship, long history, a well-established process for serving farmers, delivering value through seed.

But not every farmer wants to do business in that channel or in that Pioneer way, so we have established a very robust set of regional seed brands and are positioned well to serve there. And Judd is going to go into great detail here. But essentially, some farmers like to work with their neighbor. They want to work with a farmer dealer. They want to have good products. They want to have good service, strong relationship, and they want to do business locally. And so we're well positioned to work with farmers in that way as well.

And some farmers like to work with full-service retail. They want to have access to multiple seed brands. They want to have access to a broad range of inputs. And clearly, nearly all of our Crop Protection business is going through full-service retail. And we're improving our positioning to be able to serve seed through this channel as well, whether it's Brevant, whether it's Mycogen, whether it's PhytoGEN, whether it's Terral, it's important that we're positioned well as farmers see this as an important channel to get valuable services and valuable products.

And finally, if you can believe it, there are some farmers who don't want to do business with the Corteva brand. And so we're able to serve them and reach them with our technology through licensing. And so it is very important again that we are able to deliver our technology through a licensing model. And as an example, since we received our Enlist E3 soybean approval, we've been able to execute over 100 licenses with the regional seed companies, who will be able to deliver that technology to farmers through their brands.

So we've got a broad portfolio of seed and crop protection and digital solutions. And we have reach in the marketplace so that we can deliver this value to the customers in the way they want to be served. And to me, what's most important is that we're able to create valuable solutions for our customers and for our channel partners.

So 1 of the 5 shareholder value creation points is around developing innovative solutions. And from a commercial standpoint, that manifests itself in the form of successful product launches. So I have a few examples here on the Seed side. This is not a complete list, but it's a few examples.

2019, our new product sales on the Seed side are going to total around $1.5 billion. We've had 4 successful product launches in 2019: Enlist E3 soybeans, Qrome, LibertyLink granola, and PowerCore Ultra in Latin America. And those launches are having an impact on our results this year, but they really position us well for the future. And you're going to see adoption of those technologies really accelerate as we move forward.

On the Crop Protection side, again, I don't have a comprehensive list of all the product launches but rather a selection of key launches. Our recent Crop Protection launches are helping to deliver above-market growth. We have previously stated that our goal for new product launches, our new product sales in the Crop Protection front is $600 million in 2019. Our current forecast is that they will reach $700 million in 2019, so the adoption is successful.

We've got strong pipeline, and we're executing rapid product launches. We expect Arylex to grow by $100 million next year. We continue to see Zorvec and Isoclast adoption increase in multiple countries around the world. And we're very excited to have -- to expect to have our first sales of Inatreq in late 2019, and we expect that to ramp up to over $150 million by 2021.

So finally, I want to wrap up with a few examples, highlights from each of our regions, and I'll start off with Latin America. So our priorities in Latin America are to continue to drive margin through differentiation. We want to have rapid technology ramp-up, and technology is key in Latin America. We want to be able to continue to expand our market share in both Seed and Crop Protection, and we want to expand our Digital offer.

Since the merge, we've had many areas of success for Latin America. We've had a very strong launch of the Brevant brand. And today, Brevant is recognized in both Brazil and Argentina as a well-accepted, successful premium brand after really only one season. We've been able to establish 3 differentiated routes-to-market for Corteva across Latin America for Crop Protection, for the Pioneer brand and for Brevant. And we've been able to rapidly ramp up technologies on both the Seed and Crop Protection front. And later in the third quarter of 2019, we expect to have our first sales of Enlist E3 soybeans in Brazil.

Europe, Middle East and Africa. It's a very diverse, large, complex agricultural market. From an operational standpoint, I manage those as 2 separate regions. I have a team that focuses on Europe, and I have a team that focuses on Africa, Middle East because the opportunities and the characteristics of those market are so distinct.

In Europe, our success has been driven by new product launches, like Zorvec and Arylex. We continue business improvement through improvements in our routes-to-market, and there's a tremendous amount of focus and opportunity in Europe to gain -- to grow our business through cross-platform leverage.

In Africa, Middle East, we've been long established as the leader in seed. And we have the largest brand of corn across Africa with Pioneer and Pannar well established. It's giving us a lot of local knowledge and experience. But our Crop Protection business is really much more in a start-up mode. So what we're working is trying to take advantage of that local knowledge and that local experience that we have on the Seed side and develop a Crop Protection business. So Crop Protection is much more in the start-up mode right now, but that long experience and that strong position that we have in Seed gives us great position in markets and great local knowledge so that we can build a long -- a successful Crop Protection business over the next few years.

Asia Pacific. In Asia Pacific, you've got a very dynamic region, complex, a large number of hectares and also a very large number of small farms that we work with. We have rapid adoption of technologies in both crop protection and adoption of hybrid seeds. Asia is growing rapidly as a result of major launches in crop protection. And we're estimated that our current path of growth is about 2x the market rate. So significant performance in Asia.

We're also working to build off of our strong position in our #1 position in seed corn across Asia as well, and we recently launched the Brevant brand in India to continue to expand our reach and ability to serve more customers. Our priorities in Asia are to outperform the market through our continued expansion of Spinetoram. We want to leverage our rice portfolio, strong crop protection and growing hybrid rice seed. And finally, we want to accelerate our growth rapidly in some new emerging developing markets, like Vietnam, Myanmar, Pakistan and Bangladesh. And ultimately, we believe we still have tremendous upside to continue to expand our corn business through both the Pioneer and Pannar -- and Brevant brands.

Finally, I'll touch on North America very lightly as Judd is going to go deep here in a few moments into the U.S. Again, from an operational standpoint, we manage North America as 2 regions, United States and Canada, because of the distinct differences in terms of the product mix and the type of agriculture that we have there. It's our largest region with over 50% of our revenue.

Just a few highlights, and despite the challenging conditions that I talked about earlier, we have a tremendous number of successes in North America.

First is we've been able to successfully establish the Brevant brand in Canada in corn, soybeans, wheat and other crops. So it's well established today. Judd will talk about our implementation of our multichannel, multibrand strategy in the U.S., but we've been very successful at that as well. We launched the LibertlyLink canola trait. We launched our [colex-D] -- or we launched Enlist E3, and we also are expanding our hectares or acres of Qrome this year.

We have a strong established base, #1 brand positions in both corn and soybeans in the U.S. and Canada. And that positions us well to continue to build on a strong Crop Protection business through leveraging those consumer relationships and being able to offer a broader portfolio products.

So with that, I'm going to hand it over to Judd O'Connor to dive deep into the U.S. Judd?

Judd O’Connor
Vice president of the North America Region

Thank you. Good morning, everybody. I'm between you and freshening up your coffee. And I promise we won't do a weather report this morning, but I do get -- or appreciate the opportunity to talk with you a little bit deeper level about the U.S. business. And I'm going to do that by first going through our portfolio and some of the unique things within our portfolio as well some key initiatives that we are diving into. Then I want to spend a little time -- you've heard several times this morning about licensing and talk about how we think about licensing in the U.S., and the different channels and segments that will be impacted by that and the opportunity that creates for us.

Going to touch base on multichannel. We went through a really heavy lift and a major restructure that's going to put us in a much stronger position in this segment of the market with our multiple brands driving tremendous amount of efficiencies and improvements in margin. And then finally, the Corteva Acre and how we're thinking about the Corteva Acre with the multiple business segments that we're in, in ag today.

So with that, let me start with just a little bit about the product portfolio, which is extraordinarily robust as we brought these 3 legacy organizations together. We're launching 4 new crop protection products in the U.S.:

Lumisena seed treatment, Elevore in soybeans, EverpreX in soybeans and then Isoclast insecticide. We add that to what is already a very robust crop protection portfolio that serves almost every segment across the market. And we've got some really differentiated positions in range of pasture, nitrogen stabilizers that others in the market don't really compete well in. You've heard a lot about the new trait launches with the approvals of Qrome and E3 Enlist in China. Qrome is going to open up a whole new pool of germplasm for us and will really allow us to accelerate and differentiate further the performance of our corn products. And E3 is the game changer, offering a completely new technology to the marketplace that's an option growers that have had -- not had in the past with what we believe is a superior herbicide system versus some others in the marketplace.

Tim already mentioned the 100 new Enlist licensees that we've got signed up, and I think this is extremely relevant because think about going from 0 to 100 in about 60 days. We are absolutely entering this space and doing it in a big way. We'll talk here in just a bit about the regional brand restructuring, but that's complete. We're operational, and we're stood up and ready to go recapture some share in 2020. And then I'd be remiss if I didn't talk about just the performance of our flagship brand in Pioneer. We've got some of the best product performance that we've seen in a couple of decades, in fact, with Pioneer A-Series beans holding a north of 3-bushel yield advantage. And when you take our top 40 products by volume or by demand, more than a 5-bushel yield advantage. We haven't had that kind of performance and differentiation. And once you get that established -- you're going to be with the research team this afternoon. Geoff Graham can confirm this. Once you get that momentum rolling then your research program, it sticks, and it sticks for a long time. And so we're extremely excited about where we're at with that performance.

We'll wrap up this morning and talk a little bit about how we're creating demand via our different channels, and particularly the Pioneer brand is creating on the Crop Protection side for us. And then finally, I won't spend a lot of time on Digital because Sid is going to give you some little detailed review of the work that's going on there. But we're really ready to take a big step change forward in 2020 with our Digital offerings.

So as we think about germplasm and germplasm licensing in the U.S. for us, we've got to break down the segments in the market and how seed gets sold. And to begin with, we've got our flagship Pioneer brand, agency-exclusive, high-touch premium product performance, high value-added model with a great direct relationship with the grower. We've had tremendous success. We will continue to build on that to further strengthen and differentiate our Pioneer brand going forward.

But then after Pioneer, you think about the rest of the marketplace, and you can segment that into really 2 buckets: One is very regional, local brands in the marketplace where we've got farmer customers who say, I want to buy local. I want to buy from someone that really has a sense of the part of the country that I do business in: eastern corn belt, northern corn belt, central corn belt.

And then you got the retail channel, which is that other bucket. And they're pretty well evenly split in terms of how seed flows in the U.S., where we've got customers out there in a segment that say, "I want a one-stop shop. I want to buy my fertility, my crop protection, my seed, all the services that I receive in one place." And that's a big segment in the marketplace today.

Today, on the regional side with those local brands, those 4 brands, NuTech, Dairyland, Hoegemeyer and Seed Consultants, which is a result of the branch consolidation work that we did, would represent a good mid-, high-teens share in just that space of the market with a lot of opportunity to grow, a very great opportunity to improve and strengthen the germplasm, the performance of the products that are going through those brands as well as a big emphasis on launching E3 and putting us in a differentiated position there.

If you go to the retail side of that, and we'll talk about some of the change we've made with Mycogen as well, we've really focused that brand. We've retooled Mycogen and said this is going to be our retail-focused brand. We're putting products in that brand that are going to significantly improve the product performance. And with PhytoGEN, our cottonseed brand going through retail today and Terral in the South, we're putting a tremendous amount of emphasis to say how do we become a bigger player in the retail segment. Today, in retail, we would be mid-single digits this year. So the sky is the limit in terms of the opportunity there.

That brings me back to licensing because today, we're blessed with the situation where Pioneer obviously is 100% in-house for us, and we get 100% of that. We're mid-teens in the regional brands, and so we're going to have some organic growth within our own brands, but we're also going to be able to license to those 160 other regional seed companies in the marketplace, starting with E3 then moving into PowerCore and corn germplasm going forward. And we're also going to be able to licensing into that retail segment with partners like Nutrien and partners like WinField United and others that are going to be -- we're going to be able to license to where as the legacy organization coming from before, we weren't able to access those segments and license into those segments. Corteva can and that opens up some real opportunity for us to further penetrate the market, and we're excited about that.

All right. Just want to touch base on regional brand restructuring. And as we came together in September 2017, we had 10 regional brands in that upper left-hand corner that came from the legacy DAS organization, DuPont and Pioneer with PROaccess. As you can see, each one of those colored dots represents a point of sale for those within those brands, and we had a tremendous amount of overlap across geographies. We had a tremendous amount of inefficiency. We had folks driving past each other on the road every day that were selling our products with as many as 9 or 10 brands in individual counties in the hearts of the corn belt.

The team went to work at the conclusion of the 2018 season, and with an extraordinarily heavy lift, went from those 10 very across-geography brands and got that into 5 very geographically anchored focus and segmented brands moving forward. This was a big risk. Any time that you disrupt a brand to that degree, there's always risk of that. And we planned on having some volume loss. We knew we would have some folks that didn't want to make the trip, that were wearing a red shirt and wouldn't have interest in putting on a blue one.

But extremely happy with the results we have had at this point in time. 93% of the transition is complete and in place today within those set geographies and within those set brands. That's a big accomplishment. 40% of the points of sale in that graph on the upper left were impacted by brand change, and yet we held 85% retention of our dealers and our points of sale during the change.

We had a very rapid product line transition moving into stronger-performing Corteva germplasm. 2020 will be represented by 80% new germplasm -- or Corteva germplasm into those brands. And we have been able to drive tremendous production efficiencies by leveraging our integrated operations in our seed production footprint that we've already got in place with the other brands in the previous Pioneer organization. And we'll have a $50 million to $60 million run rate in 2021 and beyond in terms of savings in COGS because -- being able to bring those brands into that.

All -- and you include in all that being able to reduce our product count and drive productivity and efficiencies by 40%, and we feel like we had a big win here. These brands are stable. They're set to grow in 2020. The reason we had such great retention is because of the promise of Corteva and what they saw in terms of our germplasm, the crop protection portfolio, the digital tools that we have and the promise of being a pure-play ag company. And they'll tell you that when you sit down and talk with them. Why did you come -- why did you make the trip? They're excited about being part of this new company.

We've been able to leverage again the operations advantage, and we're bringing that COGS cost down. And we will continue to be able to open that funnel and bring more high-performing germplasm in these brands. So it's an extremely part of our strategy. We're over the hump, and we're ready to move forward.

All right. Final few comments, and then we'll turn this back over to Megan. Because in terms of how we think about the Corteva Acre, we are absolutely in no means a holding company that has a Seed business and has a Crop Protection business and has a Digital business. We get up every day -- and Tim talked about his leadership team. My leadership team gets up every day and their leadership teams get up every day thinking about how they're going to maximize the seed and germplasm we can get on the acre, the crop protection portfolio that we can offer growers to protect that crop and add value and the digital offerings that we can bring together to maximize value on that farm. And with the germplasm pool and the trade portfolio we have, the crop protection portfolio with 60-plus active ingredients, we got a #1 and a #2 position in corn and soy, and you're going to see some seed treatment capability that really lines up nicely behind that having the #1 volume in corn soy brand -- or positions in the marketplace. Sid is going to talk about digital solutions that we're growing rapidly and improving. And then finally, we have the best agronomy resources in the industry. When you pool all those things together and you sit down, grower by grower, across the country, with which we have the capability to do, we can add value. We can add value in a tremendous way.

Just some examples of that, step back a little bit. We can't do this alone though. And I just want to reiterate that we've got some very key strategic retail and distribution partners out there in the marketplace that we are lined up with, and they're extremely important to our success. That channel is something that we're very committed to, and we've really got some things going in the right direction. We're going to even be able to expand that further now with the ability to license germplasm and traits going forward. So we're very committed to our distribution partners.

But year-over-year, we're out there in the marketplace today with Pioneer customers now purchasing 2x -- or excuse me, we've got double the number of Pioneer customers that are purchasing Corteva crop protection products, double in 1 year of opportunity to go out and promote as a package. We've doubled the dollars in our TruChoice program that growers have prepaid sent us for our crop protection portfolio, double those dollars. Over $500 million in that represents over 25% of our entire crop protection portfolio just leveraging onto the Pioneer acre. And those Pioneer reps are working very closely with their local retail and distribution partners to make that happen. It's coming through our retail partners. And we've significantly expanded the number of those folks that have come onboard. So we're excited about where we're at with this and the leverage that it's creating in the marketplace, working both across the Pioneer and our retail channels.

So here's where we are at today. We've got an extraordinarily robust portfolio of products with new product introductions ramping up within the U.S. business. Our teams are integrated. They're running. They're at the consumer level, very focused and working on doing -- and focused on doing the things that they need to do. And that product portfolio is here today. It's not something that we're waiting on that's going to be here in 2 years or 3 years. We've got the product portfolio here today that we can go out and drive growth in the marketplace. So we're extraordinarily happy about where we stand and the opportunities in front of us and the position we are, maybe in particular, relative to some of our competitors with the jump-start we've got in terms of being in place, being focused and executing at the consumer level.

So thanks for the time, and now I'm going to turn this over to Megan.

Megan Britt
Investor Relations Director at DowDuPont

Thank you, Judd. So we're going to take a 10-minute break. We're going to actually be back around 9:32. So please feel free to refresh your coffee, as Judd said. We'll be back in about 10 minutes.

[Break]

Rajan Gajaria
Executive Vice President of Business Platforms

Welcome back. My name is Rajan Gajaria. I'm the -- between Sid Gorham and I, it's our privilege to talk to you about the business strategies that we have for the Crop Protection, Seeds and the Digital business and the action plans that we have for making sure that we are successful in all these 3 businesses in the short term, medium term and long term.

So as we get into the conversation, I think it would be remiss to not even take a moment to talk about the basics that drive our industry. So when we think about the population growth, the demand for protein and the need for productivity, that really drives our industry, both from a Crop Protection and Seed perspective. This is about $100 billion business, and it's even split between Crop Protection and Seeds. Last year, the Crop Protection business grew faster than the Seed business. But for the most part, we consider it to be an even 50-50 split between Crop Protection and Seeds. And in the last 10 years, the business has been growing at about a 3% CAGR. It's been a bit slow in the last 3 to 4 years. We've had an upswing before that. So it's just good to be grounded on the basics of what drives our entire industry.

As we walk through this conversation on the business platforms, the intent is to show you how these priorities are very intricately woven into the business strategies that we are working on across all the 3 business platforms. So yes, it's the fourth time you're seeing that and -- but did want to make sure that you see how it all fits in together.

When I talk about the business platforms -- Judd and Tim did a great job of talking about our customer focus. I'm going to focus on the other 3 elements of our strategy here. We talk about growth that is fueled by innovation. This is where -- all about where the market growth comes from. We talk a bit about shaping the portfolio of the future. All these strategies manifest differently in the 3 different businesses. And last but a very important piece is cost-advantaged operations. We talk about this on the Seed side of the business, the Crop Protection side of the business and so it's also going to give you a feel for how Digital is actually helping things be more cost advantaged as we move forward.

Before we dive into any of the business platforms per se, I do want to ensure that you walk away knowing that the magic of Corteva is across the business platforms. That's where we see the true value of how things come together. Seed-applied technology is one of those examples where its chemistry that we actually apply to the seed, and you're going to have a chance to see some of this, this afternoon about why this is a fantastic growth opportunity for us, not only through our in-house seed brands, but also through the licensing opportunities that we talk about. So seed-applied technology is one of those examples, which is a big growth possibility for us.

I want to spend a lot more time talking about Enlist. Very simply put, Enlist is our example of harnessing physics, chemistry and biology all together to create a solution that meets the needs of a grower and at great value proposition back to Corteva.

Nutrient management. Again, a great example where with the Seed business, we understand the farms better than anybody else. We've got digital tools that can point towards how the nitrogen utilization works in a particular farm. And then we have got tools like the Optimum technology, which makes sure that the nitrogen which is used stays at the corn root level. So when you bring all these things together, you create a solution for a grower, which is absolutely powerful.

We spoke a bit about the fostering opportunities and the -- I'll use the example of Africa that we discussed before. Very strong seed business. Infancy in the Crop Protection business. As with the final Crop Protection strategies and portfolio, we're trying to understand what is it that we can ramp up in that part of the world. So truly the whole answer for Corteva is across business platforms.

But let's take a step back and start thinking about the Seed business. I told you there is 3 parts to our strategy. Let's talk about innovation, which is driving our growth.

When we talk about the Seed business, innovation comes up in 2 forms: the germplasm pool and the trait technology. It's a very well-known and established that the legacy Pioneer business had the best germplasm pool across the globe. So I'm going to focus a bit on the trait side in this section in some more detail. But before we get into the details on the traits, let's look a bit on the numbers. $1.5 billion of net new sales in 2019 driven by germplasm and the traits. You see that ramping up to $4.5 billion. Now the fundamental difference on the seed business is not all of this is accretive. It is not a cumulative growth. There is a cannibalization factor to how we think about the Seed side of the business. But there is a cumulative part, and in this case, this $500 million of new growth that we have seen over and above the baseline just based upon the new technology that we're talking about. We want to focus a lot more on the traits here, but this is an area that we did want to make sure it was clear, that there is net new growth which we see driven by germplasm and the traits that we are launching.

Talking about traits, there are 3 key messages on this slide that I want to leave you with. The first message, the power of Corteva. We try not to look back into which legacy company did what because we are moving ahead, but sometimes it's useful to just look back and see what really did each party bring to the table. When we think about the seed and trait business, 80-plus percent of the business for Corteva moving forward is going to come from the legacy Pioneer germplasm. That's really where a lot of the value was. On the trait side of the business, the traits that legacy Dow AgriSciences had access to, 80% of the traits that we are launching are coming from that part of the business. So when we think about Corteva moving forward, that's the happy marriage of what the 2 different parties brought to the table. That's the first message, the power of the merger.

The second message is diversity. The new traits that we're launching in insect control, weed control, across crops, corn, soybeans, canola, cotton, we've got new protein profiles on output traits in canola, sunflowers. So that diversity is the second message I wanted to leave you with.

And the third thing is how does this compare with the rest of the industry? Our analysis and registration data that we have shows in the next 5 years, 1 of every 3 new traits that are going to be launched in the industry are basically going to come from Corteva. So very strong pipeline. It's something that we are proud of and is a big part of the Seed business as we continue to move forward. Neal is going to talk to you a lot more about the next-generation traits. So this is for the 2023 5-year planning horizon, but we've got a very strong pipeline of traits coming in after that, too.

I wanted to dig into 2 specific crops here to give you a feel for what is our trait strategy when it comes to corn and when it comes to soybeans. I think we want to make sure that there is clarity on which way Corteva is headed. If you think about the trait strategy on the corn side, you got to think about this in the above-ground and below-ground segment.

For above-ground insect control, we are moving towards PowerCore in North America and PowerCore Ultra in Latin America. PowerCore Ultra is a specific product geared towards a specific spectrum in Latin America, but both these products have got rapid ramp-up plans associated with them. When we think about below ground, Qrome is our platform of choice. We want to dig a bit more into Qrome, but the clarity of the strategy enables us to make sure that we also get the productivity that we need when we get the germplasm activity going. So this is great from a customer perspective, but also when we look back and think about the cost for doing business, when Geoff Graham and his team talk to you about the germplasm, getting the trait clarity helps us reduce the cost and focus our efforts on which part we are moving forward. So that's a feel for the corn business.

When I think about the soybean side of the business, the trump card we have is Enlist. We are working to introduce Enlist E3 soybeans in all brands of Corteva in 2019. Enlist E3 is a proprietary soybean herbicide that has been developed jointly with MS Technologies. And we are really excited not only about the possibilities for our portfolio but the licenses, which I'll talk to you a bit more about. So that's really where our main driver is.

In Latin America, we are preparing to transition to Conkesta E3 soybeans. So Conkesta E3, we are still waiting on the Chinese import approval, but our plan is that we'll be launching this early 2020 as a key product for us in Latin America. So Enlist really becomes the key backbone that we have. We've spoken about the insect side, but on the herbicide side, we've got the right platforms both for the corn business and the soybean business today. And again, like we talk about the future pipeline, we've got great products coming in there.

So that gives you an overview of what is our strategy for corn traits and soybean traits. This is proprietary traits which is what Corteva is going to build our Seed business future on.

So when you look at this, the question is, so what does this mean for specific products? So let me give you an example for Qrome. When we think about Qrome, this is going to be launched in more than 70% of the corn acres that are in our portfolio for the corn group portfolio. So that's a big part of our business as we move forward. Qrome is an example where we talk about the power of our germplasm and the traits coming together. Multiyear trials have shown that Qrome has more than a 5.5 bushel advantage over the other benchmark competitors see that we have. So we are very excited not only about the trait, but the power of the trait and germplasm coming together to make a difference. We're getting ready to launch this, like I said, this year. And we're going to ramp it up in 2020. Our targeted sales is more than $1 billion by 2023.

The other example I wanted to talk about is the Enlist weed control system. The difference between the previous conversation and here is when I talk about the Enlist weed control system, we also have the chemistry component. This is our differentiated portfolio based upon the Colex-D technology. We have invested in the capital to come up with this because in this case, we do believe that having the right trait along with the germplasm might not be enough. We want to make sure that we get the right features on the chemistry, whether it is make sure that there is no volatility, no drift, odor. And we are very proud of the fact that we've come up with the system that we are getting ready to launch.

Just to be clear, historically, we have said that the Enlist system is going to be greater than $1 billion. The reason I put $0.5 billion here in the next 5 years is to give you a sense for the ramp-up. We were very excited when we got the China import approval in January of this year. So that's where our ramp-up aspirations come from. So we are still targeting majority sales greater than $1 billion, but in the next 5 years, we're targeting $0.5 billion of sales. The demand for the products is huge. There is a growing emphasis for people to say, "How much Enlist are we going to be able to get?" So truly exciting times for us as we launch the Enlist system.

We've got a proof point in cotton, which again, gives us the confidence that not only is the chemistry going to work because cotton is a lot more susceptible to 2,4-D than we're going to launch this in beans. So very confident about the Enlist system and how -- its acceptance in the U.S.

So when you talk about all that, what does this mean in terms of dollars and cents for our income statement? When I think about the impact on royalty, we have declared this before, that we had a royalty burden of $750 million last year. Based upon the volumes we are selling and the product mix we have in this year, 2019, that royalty cost continues to go up. In 2019, we're expecting it to increase by $50 million. But based upon the adoption of the technologies that we are looking at, we do believe that we can have an impact as early as 2021, '22 but definitely before '23, where we will reverse the trend on how much the royalty impact is on the bottom line for us. So this is the value proposition of why the Seed business is going to continue to grow moving forward, because we're launching our own traits and our own germplasm as we move forward.

We spoke about the innovation driving the growth, but the other piece of the puzzle truly is cost. The market as we see the Seed business in the next 5 years, we don't see it growing rapidly. I think 0% to 1%, 1.5% is where the market going to grow at. It is a competitive market, and with the germplasm we have, we can get some pricing power. But the true value is in reducing the cost. We understand that we need a very strong cost and productivity emphasis. We are looking at our asset footprint very closely, how much product we make, the write-downs, inventory, supply chain, warehousing. This is all a key area of focus for us to make sure that we continue to drive productivity in the Seed business, at all times still focusing on the customer to make sure that we win in the marketplace. So that's what is the emphasis that we have on the Seed business: launch our own traits and the best-quality germplasm while having a very strong focus on productivity on the Seed side of the business.

I'm going to now switch to the Crop Protection side of the business and give you a feel for that. In 2019, the list of products which we call new products, initially, we had told you was going to grow by $600 million. That same group of products was actually, on the baseline of 2017, growing $400 million in 2018 and now our roll-up sales, $700 million.

As we project out for the next 5 years, that growth is $2.6 billion. Unlike the Seed business, a lot of the business that we see on the new product launches is actually accretive to the bottom line as we continue to ramp our technologies up. So there is about $2 billion cumulative growth

The new product launches is actually accretive to the bottom line as we continue to ramp our technologies up. So there is about $2 billion cumulative growth on the baseline that we see for the products that we are launching.

So I'm going to give you a feel for some of the products that we are launching and what we are getting ready to do there. 3 messages on this slide. First is diversity. We are launching new herbicides. We are launching new fungicides. We are launching new insecticides. We are launching it across crops. We are launching it across geographies. We are launching a product profile where we are very confident that all these products actually have passed the regulatory hurdles. We have got products registered. So as we continue to ramp up our technologies, we feel really good about the bottom line impact which our new products are going to have.

Just to give you an example like we did on the Seed side, I'll walk you through 3 examples. Inatreq, that's one example. This is a naturally derived fungicide; getting ready to launch that, mainly in Europe in cereals, but it also has use in bananas in other geographies. And we are expecting sales of these products to be greater than $275 million in 2023.

Reklemel. This is a new nematocide. This is yet to be launched. It's going to be launched in 2021. The total nematocide market is $1.5 billion, but it continues to grow, and we are targeting growth sales of more than $200 million by 2028. The reason for the 7-year ramp up is that we expect peak sales in 3 years after launch in each country. But the registration delays would mean that we can't launch everything at the same time, so it takes 7 years to get to a ramp up for Reklemel.

The last one I want to share was Adavelt. Again, very fascinating product. Outside of cereals in Europe, this is actually going to be a new mode of action for multiple crops across multiple geographies. More than $600 million of sales in 2030. The confidence that we have in our system, the process that we have for estimating peak sales, continues to grow because we have the proof points that it is all on track with what we are doing.

As we look at our Crop Protection portfolio, what is the impact of all these new product launches? Today, 14% of our business is patented. In 2017, that number was 11%. As we look at the ramp up of all these products, 34% of our portfolio is patented. When we talk about differentiation, these are products which are off-patent but there is no generic. So half of our portfolio is really going to be patented or differentiated in the next 5 years, and that's where the margin impact fits the bottom line and we are very confident about the growth we see there.

The last piece of the puzzle I wanted to talk about is, again, the cost. We've got a very strong emphasis on reassessing our entire asset footprint. We are changing our supply chains where appropriate. We are making products closer to the marketplace, getting the flexibility that we need, all the while building on the strong EH&S standards that we have in Corteva. This cost improvement is going to make sure that the half of the portfolio that we have, which is not patented or differentiated, is definitely cost-advantaged. We are also looking to see that if the product is neither cost-advantaged, nor patented or differentiated, we're open to divesting those, and we have started that journey. 5% of our Crop Protection portfolio would be divested, and we had one of those examples at December of last year.

So that's what I had for the Seed business and the Crop Protection business. In both cases, very aligned to the priorities that Corteva organization has laid out, and looking forward to ramping up the bottom line and the top line in both those cases.

So with that, I'm now going to turn it over to Sid to give you a feel for the digital part of the business

Sid Gorham
CEO of Granular & President of Corteva Digital Business Platform

Thank you, Rajan. Good morning, everyone. I'm excited to have the opportunity to introduce you to Corteva's Digital Business Platform. So this is our newest digital -- our newest business platform. We took the decision in Q4 of last year to centralize all of the grower-facing software and data science activities into this business platform. And that's -- it's at a financial scale, and its characteristics are quite different than Seed and CP in many ways. But we thought it was important to put digital into the same operating model that the other 2 business platforms are in so that we could get all the synergies and coordination, both in the go-to-market and the R&D side. So that was a really important move for us that we took in Q4. And one of the reasons we had such conviction that this would be a third leg for the business is that we see software and data science really making a difference in the way farms are managed, the way farmers make decisions, and in the way that the whole supply chain works. So when we think about how the agricultural supply chain works, from the manufacturers like Corteva, all the way down to the consumer, we see software and data really bringing increased transparency, increased efficiency and changing the way the whole industry works. So it's important for Corteva to be at the front of that change, to shape it and to make sure that we harness it for the value of our shareholders and our customers.

So how does software drive value for Corteva? It does it in 3 ways. Firstly, we believe that software sold to farmers can be a material new business line for Corteva. So it's going to take a while to get there but we believe that if you think about the number of farmers and acres all around the world, and the professionalization trends that Tim touched on, right, where farming is on a journey from being a very tradition-bound industry to being a much more of a real business where the business managers are looking for data to make decisions, we see a very big market opportunity to sell software to farmers.

Secondly, we see software as a way to increase the intimacy, effectiveness and efficiency of our salespeople. So when Judd mention the Corteva acre, the software in that bundle, if you -- if a farmer is buying Corteva's Seed, CP and digital tools, in some ways, digital punches above its weight because it allows the rep and the field agronomist to get much more intimate with that grower than they might be able to just by selling him Seed and CP. They're able to collaborate throughout the season. They're able to be involved in decision-making and really get a feel for the growers' whole business.

And then finally, we see opportunities whereby combining Seed, Crop Protection and digital, we can unlock new potential for our products. So there are situations where absent a digital solution, the grower would not get the full value from Corteva's, say, Crop Protection products. So we see, for example, instances where satellite imagery can guide the grower into when and how to apply our Crop Protection products and see much, much better results than he would if he was really just trying to do that on his own without a digital tool.

So we see 3 ways to drive value from our investments in digital. I'm going to spend most of our time this morning talking about the first one, software as a standalone business. And so when we go to market with software to growers, we do it under the Granular brands. And we do -- we -- most often, sell the software as a service. So it's a subscription for the grower, an annual subscription, typically, where we get high recurring revenue, strong retention and very predictable revenue stream off the sale.

So you might start by asking, why do farmers need software? So the first reason is that they actually have a very big data management challenge. Farms are incredibly complex businesses for their scale. Like if you thought about a $5 million revenue farm, relative to most other $5 million revenue businesses you find in the world, the farmer has some really unique data management challenges, and that's because so much of his business happens out of the office, right? Most businesses, the data is very contained in the office and in the accounting system and a few workbooks. Here on farms, you have a lot of data being generated by the people in the field, by the tractors in the field, by sensors in the field. And the farmer is left with this challenge of trying to figure out how do I integrate the invoice from my supplier with the satellite imagery, with the data off my John Deere tractor? And how does it all come together to give me a feel for what's happening in my business? So one of the core value propositions at Granular it delivers is that get all your data in one place, get it to make sense, get it safe and secure so that everyone in the operation can use it.

The second is collaboration. So farmers don't farm alone. They have a lot of partners, be it their pioneer agent or their banker or their landlord or their grain marketing adviser, and they need to be able to share their data and collaborate with those partners. And so one of the core -- second core value propositions that Granular offers is a safe, secure permissions-based way to do that so that you can collaborate, you might want to share some information with your landlord, but not all your information with your landlord; and some information with your lender, but not all again; and some with your agronomist. And Granular's architected in a way so that you can share -- you can give those permissions-based logins to all your partners and they can come into the system, collaborate with you and help add value to the operation.

And then finally, decision-making. So where this ultimately creates substantial value on the farm is where the farmer makes a different decision than he would have about the business than -- with Granular's products. And we have a particular focus, and this is, I think, a real competitive advantage, to thinking about farms as businesses. Of course, we have tremendous agronomic expertise, and we can help farmers decide when to plant, how to plant, what to plant, and how to manage the variability in their fields and disease and pest pressures and all that, and that's foundational to what we do, but we bring it all back to profitability. We really think of the farm as a business, and everything we bring to them with the Granular brand is centered on that, how do you drive predictable outcomes at the end of the year financially.

So it's a competitive market. There are lots of people who see the potential for selling software as a service to farmers all around the world. And so we face competition from software companies that are captive to Corteva's manufacturing competitors like Climate Corp and Bayer Monsanto, and then we face independent competitors like FBN and Indigo and others.

Our core competitive advantage is -- comes from our innovation and our scale and scope as part of Corteva. So on the innovation front, we aim to have the broadest portfolio of software tools available in the industry. We want to help the farmer with everything that he needs in his business, and I think we have a unique portfolio there that I'll describe in a second. We want to make sure that our tools are powerful in the sense that they make them -- help them make better decisions, but also easy to use. When you talk to farmers about why they aren't using software, generally, the first thing they'll tell you is it's too big a hassle, right? They're intimidated by the change management, by the sort of mindset shift that would be required to go from managing your business in notebooks to managing it in software. And so we want to excel -- it's kind of hitting that sweet spot of powerful and easy to use.

And then finally, we want to have a open technical and business strategy. So we want to be able to connect to other industry partners and not try to build everything ourselves. So there's real tendency in this type of space to try to build everything soup to nuts. And we want to make sure that we connect with people like John Deere and retailers and other parts of Corteva so that we can leverage our work here.

And then secondly, we have an enormous advantage in the scale and scope of being part of Corteva and being the third business platform at Corteva. So Judd and Tim talked about the 8,000 sales people all around the world and multiple routes to market and the really unique route to market that we have with Pioneer. That's a tremendous advantage. That's an advantage that Climate Corp doesn't have. It's an advantage that our independent competitors don't have. It's a way to get close to the right customer at the right time and introduce them to our solutions.

And secondly, we have our partnership with Neal's organization where we have buildings full of people who think about how to analyze data and make sense of agronomic outcomes and guide farmers to higher yields with better management practices. So we're looking to encode that knowledge and those models into software that helps farmers make better business decisions.

So this is a quick snapshot of our current portfolio. So we, like I said earlier, have the broadest set of software tools for farms in the industry, and we're looking to deepen them, connect them and add to them over time. So I'll describe each in turn, and I think I'll give you a flavor for what I mean by broad portfolio. So starting in the lower left, we have AcreValue, which is a tool that allows farmers or helps farmers with their land decisions. So farmers are constantly looking for ways to expand the way you grow your revenue and profit on the farm. One of the best ways, obviously, is to farm more land. And so farmers are always thinking about how do I acquire more land, how do I rent more land, am I paying the right price in rent for my land. And so AcreValue is a tool that helps them with those decisions. It's a little bit like Zillow for farmland. So it allows you to go online and research any piece of farmland in America and get a valuation estimate and see who owns it and start to think about how it might work in your operation. And so it's already the most heavily trafficked website in U.S. agriculture. So it's like Zillow. It has a lot of appeal to people, to see what their neighbor's land is worth and to see, to think about what their land is worth. So that's a really important corner of our portfolio and drives a lot of leads into our other products.

The second product we have is Granular business, and that's -- again, they use shorthand. This is like an SAP or a ERP for farms. Obviously a little bit more downscaled than SAP. But it's a tool to allow farmers to build an operating plan before they go into the year, and then execute that plan carefully and to have a rolling monthly picture of their profitability which is actually a major change for farms. A lot of farms build a plan at the beginning of the year and put it in a drawer and see what happens, see where they land at the end of the year, and this is a way for them to monitor and manage their progress throughout the year. And so this has been very strongly adopted by, what I would call, kind of the Fortune 5,000 of farms in the U.S., Canada and Australia. So the largest, most professionally managed farms that, as Tim described, that's where the industry is headed. Folks who are really managing their farm as a business, gravitate to this product.

Granular Agronomy is a precision agronomy tool. It was formally branded Encirca, and this was initially developed here in Johnston as part of Pioneer. And this is a heavily science-driven tool that allows farmers to think about managing their cropland throughout the season and managing subfield variability, and making sure that they get optimal yield for the inputs that they've purchased.

And then Granular Insights is, as Jim mentioned at the outset, a new product for us this year, and this is really intended to be a lightweight tool that allows farmers with minimal data entry, with minimal change management, to get a quick view of their financial and agronomic performance. And the reason we're so excited about this product is because it is lightweight and easy for the farmer to use, and it has a free tier and a relatively inexpensive tier. It's something that we can really lean into the Corteva channel with. It's something that every Corteva rep can bring to his grower with minimal knowledge and training. And it's something that really addresses the broad mainstream of the market where Granular business, like I said earlier, is focused on that, that top-end most professional grower.

As I said a second ago, we -- farming -- when I built software companies in many industries, and what's most challenging in this one is it's a complicated industry, and farms have tough decisions to make every year, and they're high-consequence decisions. They don't want to screw them up. But they also aren't in front of a computer all day. So the CEO of the business is in a tractor or a pickup truck running around, managing a logistically-intensive business. And so that's very challenging as a software designer or developer because the customer is sort of momentarily in the software but then back looking at a windshield or doing his daily life on the farm. And so we need to make the software super easy and intuitive so that you can have that kind of episodic use, right? It's not a sit-at-your-desk-for-3-hours-and-soaking-it type of use case. And so this is an area that I think Granular really excels in. We have sort of married consumer software design with a lot of folks on our team in San Francisco with a deep knowledge of the industry so that we're able to both give the farmer what they need, but do it in a way that's simple and intuitive.

And then it's very important that we build our tools in a way that the architecture is open and shared, right? So we want farmers to be able to join, to pick up Granular in any of our 4 products, and then seamlessly upsell, cross sell to other products and bring their data with them, right? We don't want them to start in one product and have to reenter something in the next product. And then we also, with that same kind of open and connected strategy, we want to be able to connect to industry partners. So really, the whole agriculture industry is on the journey to digitize, and Debra will describe more about Corteva's journey here.

But as we look around the industry, whether it's Cargill or John Deere or Nutrient or Corteva, everyone is trying to bring their business online, connect to their partners, connect to farmers, connect downstream to food companies and consumers. And we want to bring farmers along that journey. We want to help them connect to the other people they work with. So John Deere is a great example. Many of our customers use John Deere equipment. Many of them use John Deere's software that comes with the equipment. We've made sure that Granular and that John Deere software talk very seamlessly so the grower can get the advantage of both the people he works with.

And then we also want to connect to other parts of Corteva. So the 2 principal parts would be Debra and Neal. So Debra, looking after the enterprise systems at Corteva, we want to make sure that we can seamlessly connect to those so that we have one view of the Corteva acre, one view of the Corteva customer. And then on Neal's side, we want to make sure that we are taking advantage of the models that are being developed in R&D but also returning data to those models. Because one of the big advantages that Corteva has from all this on-farm software is the ability to see the performance of our products and our competitors' products in the real world on live farms. So we're able to share, on an anonymized basis, millions of acres of real world farm outcomes back with the R&D team which has a great kind of virtuous circle effect as we develop products.

So those are the 3 ways that digital and Granular are bringing value to Corteva. And it's my pleasure to introduce Debra, who's up next, and she'll tell you a little bit about our digital journey at Corteva.

Debra King
Senior VP & Chief Information Officer

Good morning. I am very excited to be here to talk about enterprise digitization at Corteva.

Digital means different things to different people. It's kind of a buzzword at this point. And when I think about digital relative to the enterprise, I think about a company that's automated, data-driven, with the customer at the center of everything that they do. They use data to drive efficiencies and growth.

Corteva is well on its way to being a digital company, and we need to be. Our industry is being disrupted by ag tech, and you've heard from our business leaders earlier today that we have a challenge in our competitive landscape. Now Corteva is in a very unique position right now with the spin to really accelerate our digitization journey and to drive efficiency and growth now and in the future.

So you heard Sid talk about how we use data and technology innovation to create efficiencies for our growers, to be able to run their businesses more effectively through our -- through Granular software. And you're going to hear from Neal about how we use data and technology innovations to drive efficiencies in our pipeline and to drive more effectiveness in our pipeline. And so today, I'm going to talk about enterprise digitization and how we're going to do that for the company, and ERP is a very foundational aspect of that. So we're are going to focus a lot on ERP today. And also talk about how our integrated customer experience and data foundation are going to contribute to our bottom line.

So first, I'm going to talk a little bit about IT's priorities and the role that we play in driving Corteva's business strategy. So our priorities are very simple. Spin and operate, integrate, digitize and grow our people. But just to talk a little bit about the journey to get to these priorities. I joined Corteva a couple of years ago, and I joined for really the amazing, exciting opportunity to build a new company. Jim talked about us being a startup. And so you don't get that opportunity too often. So I joined, and of course, the first priority was to enable the spin and to operate the company instead of a stand-alone environment to do that.

So enable the spin -- this is where Greg's comments about the complexity in the environment and driving costs. To enable the spin, we have to lift and shift hundreds of applications from Dow into the Corteva environment. We had to replicate hundreds of applications from DuPont into the Corteva environment. We had to absorb thousands of colleagues into our environment. All without missing a beat. They have to work. We have hundreds of sites that we needed to integrate to Corteva. So it's not just the systems, there's a tremendous amount of complexity that went into enabling the spin.

So the next is to integrate. Once we have our standalone environment, now we have this complex environment, and we need to simplify it somehow. So that's our ERP strategy that I'm going to go into more detail in a little bit. But we really need to be able to more effectively serve our customers, simplify how we operate, and just be able to be more effective and efficient.

So where does digitize come in? As we are working through our integration strategy, and we're talking about efficiencies we're going to get out of ERP. And the fact that we have to touch every single system and process, it became pretty obvious to me that this was the time -- and this was in late 2017, after the merge -- that this was the time to digitize the company, right? Since we have to touch everything anyway. And we could integrate in many different ways, but how we integrate could either enable digital better or not. And so that's where the digitization strategy came in. And it's very closely aligned with our integration strategy. And we need the right people and talent to deliver on these priorities.

So I built a leadership team that's made up of Heritage Dow and DuPont colleagues who have extensive industry experience, and I also brought in external talent with fresh perspectives from other industries. And these are proven experienced leaders that know how to drive enterprise value. And they already have. All the complexity that I talked about with the spin to enable that, that's done, that's finished. We have all the applications in the Corteva environment. We're set and ready to go. We have our standalone environment. They did it. And in the meantime, in parallel, we've been working to integrate and digitize Corteva.

So ERP is the foundational part of that, right? So on the left, you see what I talked about for the complexity of the environment. We've got 3 heritage businesses. Because Pioneer was never integrated into DuPont, so it's not 2 company environments that we're integrating, it's 3. We also have 2 very different business platforms that operate differently today. Of course, Seed and Crop Protection, and of course, we have multiple ERP systems. We have more than 3 because there a few that are scattered here and there throughout the regions. So we have this really complex environment. We worked on our strategy. And the focus was really on simplifying the environment, driving efficiencies, driving cost out and creating more efficiency and productivity at Corteva and we made the decision to go to one ERP platform. A simplified environment that is fit for purpose for ag which is unique for Corteva. And it's going to drive the efficiencies and the growth that we need.

Now in order to make sure that it's successful, because we know that ERP programs sometimes get delayed, there are sometimes challenges with it gets filled but it doesn't really meet the business needs, so we wanted to make sure that we were going to have the success that's necessary for Corteva to be able to move forward in the future So we built a plan that has governance, risk mitigation and close business alignment at its core. The governance is with the steering committee that is comprised of senior leadership and every single decision related to ERP is done in very close business alignment. We also built a schedule with the intent to de-risk the investment and get benefits as early as possible. We're focused on driving cost out, and that schedules a phased approach, which I'll talk about a little bit more in the future -- in a few minutes.

So now we've got the benefit and the value that we want to deliver early. So that's going to be through process automation and data-driven decision-making as part of our ERP implementation. So these are just some areas that we identified as early wins and areas that will set us up for value creation in the future. So to go into a few in a little more detail, let's take supply chain.

So optimized planning and scheduling is going to reduce cost of goods sold and working capital over time. And in commercial, data-driven pricing and improved customer service, personalized customer service, will drive increased customer satisfaction and improve our margin. So these are just some examples of areas where we are going to be able to get benefit early on.

Now the phased approach that I talked about before. So the intent here was maintain business continuity, de-risk the investment and get benefits early. So let me walk you through the timeline here. So in -- we started the program in 2018, and we set up a plan that was going to get us to the benefits early and deploy ERP as soon after spin as possible. And we're actually deploying the first module in early 2020, 7 months after spin.

So through the governance that I talked about before, where we're tightly managing scope, time and cost. We are able to get the process efficiencies that I referred to earlier. And those savings, we're going to start to see at the end of 2020.

And then as we deploy the rest of the ERP program, we're going to continue to get savings, and they'll accelerate over time. So this is where we're going to have the savings that are going to contribute to the EBITDA improvements that Greg mentioned earlier. In parallel to the ERP program, we're also going to be building digital capabilities that are going to drive efficiencies and growth now and in the future.

So let me talk a little bit about how they're related, ERP and digital, and it's through data. So as part of our ERP implementation, we're building a data backbone, we're bringing in data from all of our systems: transactional data, historical customer data. This is where we connect data across Corteva, from Granular to R&D, with the data that could then drive digital innovation. So the ERP implementation and the need to harmonize the data is really giving us the opportunity to accelerate our digitization of the enterprise. So to draw a little bit more of the line of sight between the value creation that ERP and digital could deliver together, I use track and trace as an example. So ERP has basic track and trace functionality, manages transactions, provides data for supply chain managers, customers, and that's what ERP provides. You talk about differentiating customer experiences and competitive advantage, there are capabilities that you could build on top of ERP that will deliver those types of results. So one example could be full transparency into the supply chain so that customers can track their order as easily as they track a pizza that they deliver until it shows up at their door. It could also provide transparency into farm-to-table tracking which is something that's really valuable to consumers. So there are multiple ways to drive value with digital capabilities on top of the ERP system enabled by data.

So these are just some examples of digital capabilities that offer an improved customer experience. But there are many.

So here are a few examples that are already in progress, and I'll refer to the first one, which is very closely and tightly related to the business strategy that we talked about earlier with cross-sell opportunities. So we have a cross-sell access and beta launch with a focus on driving top line revenue. And this is one that's, so far, we have been seeing very positive results and we intend to build upon to continue aligning with the business strategy. Other areas where we're using artificial intelligence and blockchain and other technologies is in royalties management, where even just a small efficiency can have a big impact; and in protecting ourselves against counterfeit products, which again is important for us from an efficiency standpoint, but also from a reputation standpoint and our relationship with the community.

So these are just a few examples, but we're looking everywhere at Corteva for automation opportunities to automate and simplify the environment, and we're looking for ways to drive growth. So it's happening across the entire company. We're simplifying how we do business, and we're simplifying how our customers are going to do business with us.

So Corteva is ready for the disruption. Corteva will be a disruptor. Corteva is a digital company. Thank you, and I will pass it over to Neal.

Neal Gutterson
Senior VP & Chief Technology Officer

Let me get the clicker. Thanks, Debra. All right. Well thank you, Debra, and good morning, everyone. It's my great pleasure to lead a wonderful R&D organization, a unified global R&D organization of some 5,000 people around the world who get up every day thinking about how we can create value for the farmer and, of course, create value for our shareholders.

Now I have 2 roles this morning. The first is to talk to you about how we innovate the pipeline that we have, how we create value, and how we do that in a rigorous way through governance mechanisms that we have. And the second, later after lunch, is to talk to you about the tour you're going to see, to give you a little glimpse of sort of the future of farming, as we can conceded it, and set the foundation for the organization, that you'll get some more experience of when you walk around this afternoon. And hopefully, all of you will have the chance to join us for that really important opportunity.

Now after the Investor Day we had back in November, one of our analysts, after listening to all of us, referred to us as a lean, mean, innovation machine. That's pretty gratifying to hear. And we hope, after you hear what we've all had to say and what I have to say and then the tour this afternoon, you'll come to that same conclusion.

So let me start with a set of principles for innovation that are deeply embedded into how this R&D organization works, but also provide the framework for my remarks today in conversation with you.

So first of all, we are market-driven. Everything we do is -- keeps the customer and the consumer first and foremost in mind. Second, we're disciplined and accountable. We have governance process, as I said, that help us make sure that we're using your capital very effectively, capital of our shareholders very effectively, and that we have a chance to maximize return on invested capital, which is very much foremost in our minds. Third, we're global and yet local. You're today sitting in one of our 2 major innovation helps, here in Johnston, Iowa. Our second one is in Indianapolis, Indiana. But despite those 2 major hubs, some 2/3 of all of our organization is scattered elsewhere around the world, developing local solutions adapted to local markets and regional needs. The fourth point is that we're built to differentiate. Our job in R&D is to develop differentiated offerings for the business and to do that using differentiated capabilities. Ultimately, from differentiation comes growth. And finally, we're laser-focused on productivity. We know that being efficient and effective and improving that year-by-year is a source of true competitive advantage for us as a research organization.

So let's talk about the first principle being market-driven. I described a moment ago how we work. This now starts to frame how we come up with our priorities as an R&D organization. And you hear us talk a lot about the yield, the yield of our products and protecting yield. But for the farmer, yield is not the whole story. What they care about is increasing profitability, improving performance, and ultimately, finding from us simpler and simpler solutions for them on the farm, and we're dedicated to that.

At the same time, and you heard from Tim earlier and Judd, that we have this tremendous relationship with our farmer customers around the world, and that's a source of advantage that we can understand what our customers need and meet their expectations, both the farmer and, ultimately, the consumer that, that farmer serves. In addition, we know that our products face evolutionary pressures in the field, and we can lose effectiveness of traits, lose effectiveness of chemical products. And so we're very much focused on extending the durability of those products, in some cases, by combining them together in integrated solutions. And that creates value, again, both for the farmer and for our shareholders. And finally, we know that the environment is changing all the time. The expectations on us from the consumer for improving the environmental outcomes from farming are real. And we work to meet those needs on a regular basis, including the changing landscape for regulatory demands around the world. Ultimately, our fundamental goal is to help the farmer deliver healthy food in an environmentally sustainable way for the planet. And as you'll see in a moment, our innovation priorities are structured to reflect this set of market-driven needs.

So I talked about the priorities. This just gives kind of a schematic to give you a feel for how we set those priorities. You've heard about the 3 business platforms: Our Seed, Crop Protection and digital platforms. And the size of that triangle gives you a sense that the great majority of our priorities are driven by what the business needs -- are identified by the commercial organization in the platforms. At the same time, we know the world is changing, and you've heard about that from many of us already this morning. And so we have to have an eye out for how the world may be disrupting our particular business model, and potentially, how we can actually disrupt maybe ourselves or other aspects of the business. And so we also developed a set of priorities based on those disruptive business opportunities that we see. And ultimately, a couple of key takeaways here, is that first of all, everything we do in R&D is business-driven; aligned with business, aligned to our overall strategy. But the second point, again, to remind you, is that the preponderance of our priorities still are fundamentally focused on the core business needs today, delivering through our business platforms and our business portfolios.

So let me take now the second principle I talked about, being disciplined and accountable. And of course, always starting again with the customer in mind. And this lays out, this slide, how we make sure that the $1.2 billion we're spending this year is really put to good use and works to maximize our return on invested capital. So it starts with a global team, our global innovation and investment forum, which is comprised of a few leaders from the executive team, and that includes Jim and Greg and Tim and Rajan and myself, and our view is to make sure we allocate capital across those 4 portfolios in a way to maximize the return on investment. Now much of the detailed allocation of capital happens in those individual portfolios. And you can see at the bottom, the composition of those teams and some of their core functions. Importantly, decisions about advancement of products will happen at that level, and I'll give you a little bit of insight into that in just a moment, how we structure that. But also important is the membership of those teams. It's R&D leaders, it's platform leaders, there's input from commercial and other functions. And so in that mechanism, we make sure that the priorities we set at that portfolio level are totally aligned to business needs.

Now I talked about the structure through which we deliver that discipline and accountability for the organization. Let me talk just a little bit more about the processes that we use. So in this slide, you can see on the left that same governance structure of those 4 portfolios. Now we know the different types of innovation require different management processes and different governance mechanisms to ensure that we get the maximum value out of the money we spend. And so we use actually different types of governance mechanisms under our program management umbrella. For the core platforms of Seeds & Traits and Crop Protection, we use the standard stages and gateway mechanism. In contrast -- and that's because we have a very good idea of what we're going to deliver, and so we're just tracking the allocation of resources along the pipeline to deliver those outcomes. But for digital and the disruptive business innovation, we use a different model. It's a learning-based model in which we have milestones that are set and we can decide, with early allocation of capital, whether we continue a project or terminate a project or reallocate capital later if we have better use of capital. And so those 2 different tools are really important to ensure that we maximize the value of return on our investment in innovation.

And finally, we have a set of processes and very strongly defined criteria at each stage, whether it's a milestone or a stage gate along the way, so we can make good, clear decisions to terminate projects that aren't being productive and reallocate capital, or advance as we have -- if we meet the criteria we've established. And importantly, for an innovation organization like we have, what we want to do is turn over projects early. And we're not spending that much money. We've learned something, moved on to something more valuable. But when we get to a later stage, we really don't want to have any turnover in our projects. And I'll show you that in this next slide.

So this brings to life the stages and gateways type approach that we have for the core innovations in the Seed and Crop Protection portfolio. And as you can see, there are 8 stages. And in between each stage is a different gate. And we set a criteria to advance between each of those stages. The important point being that when we merged, we had some variation in these particular processes, the stages and gateways between legacy Dow, legacy DuPont, between Crop Protection and Traits. And we decided, to enhance our ability to govern effectively, we would develop one integrated stages and gateways mechanism. And the beauty of that is that at each stage, we reduced the risk that a particular candidate product will not get to the market. We enhanced its probability of success. And we also -- we know we're going to be increasing the allocation of capital as we go along. And so we make sure that as the risk goes down, it's then when we can actually allocate increased capital. And we have a set of gatekeepers who -- to manage those transitions from one stage to another.

And you can see here just a quick snapshot of the number of advancements we had in 2018. A nicely balanced portfolio with 6 advancements in the Crop Protection side and 7 advancements in the Seed side. And importantly, no terminations once we got to stage 3, which is really our stage of commitment to a commercial launch of a product.

The next principle I talked about is being global and yet local. So when you think about the global scale we have, of course, we have our state-of-the-art innovation hubs here and in Indiana, as I mentioned. And as you'll see hopefully in the tour today, that we have best-in-class infrastructure for supporting the innovation that we want to have as an organization. And I'll talk a bit more about capabilities. But to go with that scale, we can then invest in critical capabilities that enable us to be successful. And that includes, for example, industry-leading synthetic and formulation chemistry. I'll comment a little bit more about that. But also, leading-edge genomic expertise and, of course, data analytics and you've heard a lot about the importance of data already from Sid and Debra. However, this has to be applied locally. What we learn, the assets we developed have to be applied locally. And so to do that, we have over 150 research facilities in 32 countries around the world, and a regional lab network that interconnects. Importantly, we also have local partners, and that can be academics, it can be government agencies in different parts of the world. And all of that enabling the set of results you see on the right, particularly and just briefly, because you can read most of that, our solutions tailored for the local environment. And that's the critical aspect of the global scale applied locally to deliver local solutions.

And I mentioned the capabilities that are critical to enable that global yet local strategy to come to life. And one of the beauties of the merger, and you heard about this from Rajan, is that we can bring together, not just a diverse portfolio which is an incredible asset for us and is fundamental to our strategy, but also a set of diverse capabilities. So we have a set of tools that is, I think, perhaps unparalleled in its breadth across the industry.

You're going to hear quite a bit about the Seed supporting capabilities in the tour today, so I'm not going to say a lot about that. I just want to say a couple of words about the Crop Protection capabilities. And what I want to do is just give you some proof points rather than explaining the capabilities per se. So for example, on the discovery side, we learned this from the outside even, when we went through the merger, the level of efficiency of -- and cost-effectiveness of our discovery program to develop leads, new active ingredients for the market, was unparalleled. The second point is about formulation and process chemistry. And you heard earlier from Rajan about the Colex-D technology that's really critical to the 2, 4-D formulations that have reduced drift in the market. And that's an outstanding proof point for the capability we have in formulation and process chemistry, which will become, I think, even more important in the future as we have targeted application in those chemistries across large acres.

And finally, we have what we feel confidently as the industry-leading of set of national product capabilities. And the proof point for that comes with -- in our existing portfolio of Spinosyn products, insecticides, as well as to now being launched Inatreq as essentially a natural product. And we have fundamentally the largest sales from natural products that includes into the organic market. And of course, data science, data analytics, digital tools, underlie and support all of those capabilities, and you'll see quite a bit about that on the tour later today, and I'll say a few more words before we finish.

Now ultimately, we're pretty proud of our talent, but we know there are vastly more smart people around the world outside our walls than inside our walls. We also know that there's a lot more money being spent outside our walls than inside our walls. And so it's important we tap into that source of innovation, both from a financial and talent and an IP perspective. And so you can see just a snapshot of some of the relationships that are critical to us, and they come across from academic, to startups, focused on product developments, focused on, in the case of planet, access to satellite imagery that's fundamental to both research and the customer-facing side of the business. I can tell you a lot about all of those. But broadly, they give us access to expertise and talent that we otherwise wouldn't have.

I also want to comment on another aspect of how we partner with the outside world, and this is our open-innovation model, open-innovation approach. And we launched a new portal about 2 years ago to help innovators find us. I mean, if what we can do is knock on the doors of other people, we can't knock on enough doors. We want people to find us. And so we now have a mechanism of identifying the problems we care about so our potential partners can become new partners and develop new relationships. And in this mechanism we do some funding, some old grants to start up new partnerships. And one of the critical areas here is with CRISPR and Caribou and [castline] and [Broad] are examples of those kinds of relationships. And in the ways we work in an open innovation model, we can enable partners with technology support as well as IP in this open innovation strategy.

So now I want to turn to the next principle about being built to differentiate and how that creates sources of value for the farmer. So you can see that we do this, create value for the farmer, in 3 ways: First of all, in the Seed, and that's through breeding, digital breeding or targeted breeding, and biotech.

We do it on the seed through seed of life technology, and you'll see that on the tour today. And we do it finally on the farm, Crop Protection tools, digital and agronomy. And this slide, I think, mirrors very much what you heard from Judd about all of this comprising our ability to deliver a Corteva acre solution for the farmer. And ultimately, that integrated solution is essentially a fourth sort of capability well and way to differentiate to create value for the farmer. So I'll spend most of the rest of the time talking about those different ways we differentiate. The first is the germplasm advantage. You heard about that quite a bit from others already. I think the important thing is that the quality of the germplasm we have is at the heart -- a starting point for a very significant competitive advantage in the marketplace. We made that a sustainable competitive advantage by the systems that we have, which today we refer to as digital breeding. This isn't your grandfather's breeding of 50, 75 years ago, this is really a breeding system where everything is driven by data and supported by software tools. And it starts with automation in the greenhouse, in the field and the lab to begin with. And so data sciences at the foundation of being able to automate tremendous number of processes that give us better-quality products and a quicker and more efficient and cost-effective overall breeding program. And the second important point is that we have, based on population genomics, the ability to predict the performance of candidate new varieties before they ever get tested in the field. One of the most expensive things we do in breeding is actually testing a product in the field. But the data analytics we've built that can link genomics with performance allows us to predict and continually reduce the percent of products we actually have to test or candidate products in the field. And that leads to a much more cost effective and actually a broader base of selection of new varieties, and you'll hear quite a bit about this later today in the tour. Ultimately, when we do take products, candidate products into the field to test them, we want to make that very efficient. And historically, you would have students walking around the field, the sticks and measuring things. Today, it is done through remote sensing and proximal sensing from satellites. The quality of the data, the cost-effectiveness of that data capture mechanism, has expanded dramatically compared to what it was just

10 years ago. And examples of this, you can see a drone that one of our scientist is holding on the right. You'll see some examples of drones that are a little smaller than that when you go to the tour later today. And a couple of snapshots on the right: the upper part giving a sense of an individual plots in maturity of individual varieties being tested; and the lower right, that rather arcane picture, is actually a way to look at plant height in individual plots, and plant height's being an important parameter for releasing varieties.

Ultimately, it's again about the proof point for the quality of these digital breeding in the germplasm assets that we have. You heard about this from Judd earlier. The 3.5 bushel per acre advantage in our series -- on our A-Series soybeans and the over 5 bushel per acre advantage we see in our top varieties for corn in North America. Now of course, in most of our major markets, we launch threaded products, not just -- well, not just germplasm into the marketplace. And so fundamentally, insect control, herbicide tolerance, also in some cases, some output traits that we have. And one of the key aspects of this picture of the trait side, you heard a lot about from Rajan, I'm not going to dwell on it. But it's the drive to reduce the royalty obligations that we have today and to increase our margins over the next 5 and 10 years. And a lot of that you can see on the left side with trades we already are developing. A good example that you haven't talked much about before is optimum glide herbicide tolerance trait with a very clear connection to reduction in royalty obligations as that penetrates the market. On the right side, and you'll hear a bit more about this on the tour this afternoon, are some examples of the longer-term portfolio that we have. And overall, we see a superior proprietary trait pipeline that will allow us to drive down our royalty obligations in the next decade to get to a point of when we think of trait independence. And you'll see examples of our new Lepidopteran Protection below-ground trait. When you go to the tour today for corn rootworm control, it's an outstanding example of some of the advantages we've developed in trait development by using not just Bt proteins as actives, but non-Bt proteins. And ultimately, source is coming from plants. So you'll see that on the tour today. You'll also get a little glimpse, as you can see at the bottom of the very early stage of our development, which just starts with protein actives. And we have a very robust set of early-stage actives that will underlie the continued development of new traits that will keep us in a strong position of threaded products around the world. Another aspect of differentiation is targeted breeding. And I think you've heard a lot about what we're doing here. The fact that we have the broadest CRISPR patent estate in the agricultural industry. In our case, focusing on CRISPR-Cas9. We have both foundational IP that we've talked about, but also our own IP that's focused on particular applications. And that estate continues to grow.

Now we've been focusing this effort around targeted breeding down to a few really critical areas, including things like disease resistance and output traits like improved oil quality or protein. And then fundamentally, yield and yield stability for the farmer. We identified our first product to launch, NextGen waxy specialty starch as a way of establishing regulatory paradigms and supporting the dialogue around public perception. We're well along that journey. We have a first phase of a pre-commercial pilot, that is being conducted this year. And that waxy corn hybrid, that's the next-gen version, has been validated with a 5 to 6 bushel per acre yield advantage, which is an example of the kind of advantage and benefits we will see with other applications of CRISPR-based genome editing. And we have other products in the pipeline, high oleic, low linoleic soybean and others, as I mentioned, above in terms of disease resistance, for example, that we are working on very actively in the lab today. And you'll hear a little bit more about this on the tour as well. Another important source of differentiation that we bring to the R&D organization, as you heard earlier, is about our natural and naturally derived products. And I want to just walk you briefly through this slide because it establishes not just the value of natural products that can be used, for example, to serve the organic market, but also that natural products can be a source of discovering new modes of action. And new modes of action are one of the important criteria for advancing our objectives to move from sort of off-patent to proprietary high-margin products. And you heard about some of this from Rajan. Inatreq, essentially a natural product identified for us a new mode of action, never introduced into the market previously in any crop. And cereal crops in Europe, bananas, are the target markets today. You also heard about Adavelt. Adavelt is a synthetic chemical. It's naturally inspired in its synthesis, targets the same mode of action that expands that to a much larger set of pathogen targets in crops around the world. And in light fashion, we did extended this to try to find essentially over the other uses and other major markets and we've identified a third-generation solution. Again, naturally inspired that addresses Asian soybean rust. And so it just highlights, I think, the value of a natural product strategy that gives us a foundation for multiple generations of products for the long term. And speaking about Asian soybean rust, it's a great example of this cross-platform solution as another source of differentiation. And here is a lovely example of all the components you've heard about throughout the day. And just to give you a little feel for what this means, I mean, Asian soybean rust, first of all, is an extremely large target market for us. It's the #1 fungicide market for soybeans globally, incredibly important issue in Brazil. And you can think about this as using digital tools, computer vision, remote sensing to actually scout in the field, identify whether there's a problem, applied chemistry, where that problem is arising. But at the same time, we can develop transgenic products and native-trait products that are more resistant to that, and the combination of all those tools can offer the farmer a truly unique solution to control Asian soybean rust on their field. And we're starting to actually do some of those components of testing of those new solutions today. Now the last source of competitive differentiation for the R&D organization supporting the business comes around digital. I just want remind you, before I talk about that, of this slide you've seen a number of times earlier today. R&D plays in the left- and right-hand side. Obviously, we use data analytics and digital tools to improve the cost and quality of our data and the speed of product innovation. And we support the customer-facing part of the business with new software tools, ergonomic insights that Sid nicely captured that, the software can embed that -- those insights actually -- that we can embed those insights into software products. So with that framework in mind, you can begin to look here at the kinds of enhanced-research outcomes we can generate using data analytics. And all the types of research tools we have and capabilities are supported by data analytics. I'm not going to go through it. You'll hear about that quite a bit on the tour. But the important point is as we develop new tools like remote sensing or predictive analytics, we can use those same insights to actually support farmer solutions to the Granular brand. And so it gives us a real great leverage on the R&D investment we make for our own purposes internally to R&D to be leveraged to improve the return on invested capital that we have. And finally then, to end on this concept of productivity, we know that it's the data analytics, the software, the automation that's at the heart of how we continually improve the effectiveness and efficiency of our research enterprise. Now I'll just quickly touch on 4 examples. Just 3 years ago, it took 0.5 years to do the sequencing of a new genome at a cost of $150,000. We dropped that time by twentyfold, and it's dropping still and the cost by fourfold. So it enables us, and you'll hear more about this again on the tour, to be able to free up our ability to sequence a large percentage of all the varieties that we're developing in our collection.

Second point is about genomics data analysis, which is critical to screening what we want to put in the field. And so here, if you look at those numbers, you'll actually realize that we're spending more today on markers to characterize our products and our pipeline than we did 10 years ago. But because this is much less expensive than actually testing those materials in the field, the net cost of our testing programs have dropped substantially. On the field analytics side, the number of drones we fly to look at data in the field, a hundredfold increase in the last 4 years. And finally, in order to get more effective and reliable in our discovery of new actives for insect control traits, for example, or insecticides, we can now screen much higher rate in the lab. And we have additional projects in-flight continually to improve productivity and drive an improvement and return on invested capital. So to close out my portion, I just want to recap those 5 innovation principles that are at the heart of everything we do in R&D, how we create value for our shareholders and our farmer customers, and I want to just reinforce quickly the last 2 points. You've heard a lot about differentiation and how important that is to actually foster differentiated capabilities, that enable us to generate differentiated products for the company, and ultimately, the focus, the laser focus on productivity to improve return on invested capital for every dollar that we invest in innovation. So with that in mind, I'm going to turn it back to Megan to wrap things up here.

Megan Britt
Investor Relations Director at DowDuPont
Thanks, Neal. So actually, we're now turning over to Q&A. I'm going to invite the management team to select the knights for the roundtable up here, kind of take a seat. We have about 30 minutes available for Q&A today to kind of stay on track for our R&D tours, which you might have heard from Neal, we intend to have some R&D tours. So it looks like we've got John Roberts there in the back, if you want to start with John. And John, just make sure we got a microphone in him.

Question and Answer

John Ezekiel E. Roberts
UBS Investment Bank, Research Division

Two questions. Given 2019 is a weak year for a variety of reasons, you've got a -- I think a target of growing EBITDA 2x sales. Is 2020 a higher leverage year, more earnings growth to sales than your kind of algorithm you have longer term? And then secondly, you gave us the excluded business adjustment and the new reconciliation from operating segment to standalone. There's also an adjustment in other. Is that the Dow chlorine relationship? I know a lot of the chemistry is chlorine-related and so forth, but what's the adjustment in the other?

Gregory R. Friedman
Executive VP & CFO

Yes. I'll start with the second question first and hit it back over to Jim. The other adjustment that's in the -- that's in that reconciliation, there was an amount that was about $174 million, and it included -- excluded businesses, which is primarily the toll on product line. It had our non-op pension and then it had other. That other, like I said, is primarily accounting adjustments. It's to bring the accounting that was used for Dow AgroSciences, in line with the accounting practices that we have in Corteva. So there's just a number of adjustments that we had to make in order to align those. It's not a separate business.

James C. Collins
Chief Executive Officer

Yes. And it's a great question, John. So if you go back to one of the charts that Greg had, where he talked about waterfalling our '18 to '19, there are a couple of large green bars on there. One is the synergies delivering. We can see those in our financials. We see them in our costs. The others, the new product launches. And you heard Rajan talk -- Rajan and Tim both talked about year-over-year revenue and the products that we can point to, and that pipeline is delivering better and faster than our original plan. So as you think about our waterfall here from '19 to '20, we still have those 2 tailwinds with us. And then for want of -- the other issues that you saw in Greg's chart, weather-related issues, currency, a big drag, raw materials in from China. We would have had an outstanding year here in '19. So those same tailwinds will be with us going into '20. We're right now very focused on delivering this year. We're going to stay focused on driving this thing right through to the end of the year and deliver on those commitments that we are making. And we'll be back to you later in the year as we have a good sense for what '20 looks like within the other headwinds that we see out there. But as Greg said, we're lapping a lot of those and we're going to set ourselves up to be in a good spot. But right now, let's get the half done, get the full year '19 done and then move on.

Megan Britt
Investor Relations Director at DowDuPont

So I see Steve's got his hand up in the back there.

Steve Byrne
BofA Merrill Lynch, Research Division

On the Enlist trait, for these hundred licensees, how long would you think it would take before they could breed that trait into their genetics? And in your own platform under the Pioneer brand, how many different soybean varieties do you sell? And is that trait been bred into any of them? Or is this really focused on the pipeline of genetics that's coming?

James C. Collins
Chief Executive Officer

Rajan, want to take that?

Rajan Gajaria
Executive Vice President of Business Platforms

Yes. Like you know us, Steve, we mentioned that we've got relationship with MS Tech. And in some cases, we have straight off the bat, working on germplasm that we have partnered with them for the multichannel brands and also with the licensees. That being said, we've got a very aggressive program to start getting enlisted to our -- on germplasm. And as early as end of this year, we'll see how that whole thing is coming together. So we want a strong, aggressive plan for getting germplasm within the Pioneer brands and our own germplasm pool. But at this point of time, we are not limited by the portfolio. We've got a legacy that's germplasm. We've got partnership with MS Tech, so we are getting ready to ramp it up as early as next year.

Megan Britt
Investor Relations Director at DowDuPont

Mr. [Jernis] , you have a question?

Unknown Attendee

I have a two-parter, if you don't mind. First off, you had a launch of peak sales numbers, and 20 years of history suggested peak sales numbers are magical fairytale numbers with no relationship to reality. Could you translate those into incremental EBITDA numbers for us. And as a follow-up to that, just trying to see if my math is right. So you're guiding 5% to 10% EBITDA growth per year-ish. About half of that is to come from cost-cutting and efficiencies, so that leaves us a best case scenario, about 5% EBITDA growth from innovation. That translates about $100 million per year, but your R&D budget is $1.2 billion. So am I missing something here? Or should we rethink how much money we're spending on R&D?[Isoclast]. Sorry about that.

James C. Collins
Chief Executive Officer

Rajan would start.

Rajan Gajaria
Executive Vice President of Business Platforms

I can take a shot at the peak sales conversation and then go from there. So when you think about peak sales, let's just think about the slightly differently for the Crop Protection part of the business and the seed part of the business. The reason we wanted to start compartmentalizing this into 2023 numbers is: one, the regulatory time lines keep changing for some of the products. So for the Crop Protection business, I showed a number of $2.6 billion, of which $2 billion is actually cumulative. If you just think about the baseline of where we are getting started at $6.4 billion, at $2 billion, we get the revenue stream of $8.4 billion and the portfolio is going to change dramatically, like I said, about 35% of our portfolio will be patented. The margin that we make in those products is different than the commodity business, and you can actually benchmark that with other competitive things, and within our portfolio and our competition. So I think the margin dollars, which you see from innovation and the Crop Protection side is actually pretty significant, and we can go to the math there. On the seed side of the business, when we talk about peak sales, I think, it's a bit of a misnomer on the trait side because on the trait side, yes, we can ramp up and look at the adoption and see where we want to get to. But on the germplasm perspective, we get new products launched every year. So when I talked about the $4.5 billion of new sales in the next 5 years, a part of that is actually things that we keep continuing to replenish on an ongoing business. So that's why the $500 million of what is cumulative is the net growth that we see. But this typically in our history would stay, is a higher-margin business because we can get price advantage based upon the fact that the yield is definitely better. So from that perspective, when you look at the Crop Protection side of the business and seed side of the business, slightly different in terms of how the new business grows, but both of them add differently to the bottom line. And the margins would justify in the R&D spend that we have on both sides of the business.

Neal Gutterson

Senior VP & Chief Technology Officer

Maybe just to finish that. One program, project that Rajan and I both are very interested in. You're right, that translation from peak revenue to EBITDA is always kind of hard to do because the ramp-up of products as they ramp, their COGS rates come down dramatically over time too. That first product sale of a brand new chemistry carries with it the full weight of the development cost of that new active ingredient. But then as our volumes go up, our plants become more efficient, we're going to challenge the organization to drive to not just peak sales or what we call peak custom goods, which is kind of the lowest point in a product's life cycle where COGS hit that. So you maximize the margin potential and you do that faster. And so we've got a good team looking on that and how do we kind of change our mindset there. So hey, you want to add some on R&D costs?

Gregory R. Friedman
Executive VP & CFO

Yes. Just on R&D costs. As Neal mentioned, we -- our plan for 2019 is $1.2 billion in spend in R&D. That's about 8% of revenue. And we do, while we do plan on spending more in R&D as time goes on, we don't anticipate that that growth in spend would grow at the same rate as our revenues. And mostly because of the efficiencies that Neal talked about in our R&D practices in the process, bringing digital in allows him to get more out of each dollar, and that improves every single year. So the growth in R&D spend will not necessarily mirror what we would see on the sales side from a growth perspective. Neal, anything else for you there?

Neal Gutterson
Senior VP & Chief Technology Officer

I think that cuts it pretty well. I mean, the other thing to add is about the germplasm, right? It isn't just replacement, just to emphasize that point, right? We do get improved performance on a regular annual basis, and that investment is really critical to our continuing the position in the marketplace.

Megan Britt
Investor Relations Director at DowDuPont

Jeff?

Jeffrey John Zekauskas
JP Morgan Chase & Co, Research Division

I have a question about Enlist versus Xtend. So in the United States, if you're a farmer and you're using Xtend, why would you want to switch to Enlist? Or maybe you can discuss a particular weed categories that Xtend touches versus Enlist. Would there be a particular area of the country that you would expect to switch over faster? And then just for academic interest, why wasn't Enlist stacked on top of Xtend?

James C. Collins
Chief Executive Officer

Judd, you want to start with maybe some [Enlist]] discussion.

Judd O'Connor
Vice president of the North America Region

So why Enlist versus Xtend, if you can just put the technology side-by-side and let's even take it a step further and say it's an equally yielding germplasm with the same defensive traits this program-to-program-wide: One, less risk or at least, the experience we've had: Significantly less risk of off or outside-of-boundary damaged other crops. Enlist has been -- our buffers are narrower.

James C. Collins
Chief Executive Officer

Yes.

Judd O'Connor
Vice president of the North America Region

The label buffers are narrower because technology's pretty much proven. We know we've experienced because we've been very committed to the Xtend technology and our A-Series beans that we've had some challenge with that, and Enlist takes that up a notch and takes it up a level. From an efficacy standpoint, there are pockets around the country where we have maybe differentiation, but I wouldn't say that there's an extreme difference in terms of efficacy of the 2 products. They both work quite well, no question.

And then I think it brings another option to the marketplace, and we'll bring it in differentiated germplasm. And when we get it into A-Series germplasm, we're going to bring a yield in addition to the herbicide system with a safer, less volatile product. So those would be the base reasons, and we've got many growers, particularly in sensitive areas where we've got vegetable crops or we've orchard-type crops that are coming to us. And they want 100% of their farms switched to Enlist to-date.

Timothy P. Glenn
Executive VP & Chief Commercial Officer

The one thing I would -- I would just add is we're a few years of experience with Xtend and obviously our first wide-scale use on Enlist in soybeans, there are farmers who are not getting the full benefit of the Xtend system today because there's concerns about using it over the top in season. And so I think that this will be potentially be a better option for those who have been reluctant to use it in season. So they're getting some benefit -- a partial benefit from the herbicide program. But they're not potentially getting all the benefit, and so we think that Enlist is going to open that door for more in-season use than maybe they're experiencing today with Xtend.

Rajan Gajaria
Executive Vice President of Business Platforms

And then Judd, correct me if I'm wrong, but are retailers who are refusing to spray Dicamba right now. And it's not the only one, Dicamba. But that's the difference. When we talk about 2,4-D, we spoke about the Colex-D technology, you've got patented technology over the top. I don't know. There's about 20 plus registrants of Dicamba, so that is from product stewardship standpoint. The work that Judd and his team put in over Xtend is very different than what we see in space. So retailers are actually not very open to spring Dicamba. There are parts of the country where maybe 1 out of every 3 acres that in extreme basis is actually sprayed with the chemistry. They're just using the beans for what it is. So Enlist, for some of the reasons mentioned, I think it's an idea whose time has come. And we are going to see a very rapid adoption of the technology not only because of the value it brings to the customer but the whole channel. The retailers do not want to deal with some of those issues which come up from use of the chemistry.

James C. Collins
Chief Executive Officer

Maybe I'll just add a final comment. We see a role for both programs from a resistant management perspective, right? The opportunity to apply different chemistries on different weeds in a rotational program to just kind of protect and preserve the access to this chemistry for as long as we can. But Judd's comment about growers that are in sensitive locations, maybe they're not surrounded by a lot of other cropland. But they've got other things like orchards or specialty crops. Well, that's probably where the strongest demand seems to be coming from. Anybody want to comment on stacking Enlist with Xtend?

Rajan Gajaria
Executive Vice President of Business Platforms

Maybe I'll just take a shot at it. I think it's never say never because we want to make sure that all the tools are available. There are pockets wherein the mode of action might not be as differentiated, so the value proposition might not be as compelling. So we've seen one of our competitors is talking about a 2,4-D trait in the near future of 5, 6 years down the line, maybe more. So we'll see how the technologies get adopted. But building on what Jim said, there is room for both technologies in the marketplace. And we'll see how the adoption depends upon either the wheat spectrum, closeness to sensitive crops or just the general efficiency of using the product down there. So let's see what the future has in store.

Megan Britt
Investor Relations Director at DowDuPont

[indiscernible] right there now.

Vincent Stephen Andrews
Morgan Stanley, Research Division

Vincent Andrews with Morgan Stanley. Can we talk a little bit about how seed salespeople are compensated and, in particular, how much of their comp is a function of price/mix achievement versus market share or volume, and how that ratio may have changed in recent seasons? And how did it differ for both companies prior to the merger maybe versus today?

James C. Collins
Chief Executive Officer

Yes. Do you want to talk about 1 or 2...

Judd O'Connor
Vice president of the North America Region

Yes. So I guess it depends on what level in the organization. Our sales agents are compensated on net sales dollars. They earn commission based on net sales dollars. Our employees have a base salary plus benefits and then incentives that are targeted on bringing profitable growth to the business. It's just an earned incentive.

The DAS organization in terms of differing would've been more dealer-based in terms of they would sell at a transfer price, and then those dealers would have been expected to put some type of margin on that. And there's just a different kind of agency versus a dealer-type arrangement. And DAS employees were compensated with base and then growth incentive targets from the employee-versus-dealer standpoint, very industry-typical-type arrangement.

Vincent Stephen Andrews
Morgan Stanley, Research Division

Would price be 25% of compensation? 50% of compensation? 10%? 5%?

Judd O'Connor
Vice president of the North America Region

So price would translate into net sales -- into that net sales. And so they'd certainly be benefited by maintaining and growing margin and maintaining acceptable net pricing levels.

James C. Collins
Chief Executive Officer

Net sales mix, yes.

Megan Britt
Investor Relations Director at DowDuPont

I think we're going to go right there. Right.

Unknown Attendee

If the U.S. ag market, both seed and chemical, is flat, say, for the next 5 years, what does that do to the I guess your longer-term 5-year algorithm? And then somewhat as a corollary, if that's your view today, would you change R&D? Would you -- do you have levers maybe in Latin America, Asia, some of the faster-growing areas that you could switch to and then switch some either research or CapEx there?

James C. Collins
Chief Executive Officer

I mean you saw from Tim's charts -- first of all, we're a global business. And there are markets around the world that are growing tremendously, and Brazil is a great example of that. Argentina will continue to be -- and you saw some of the sales numbers that we had in first quarter in Asia Pacific. So -- and remember we're both in the Seed and the Crop Protection business too so our -- and with our digital platform. So we've got opportunities to grow revenue and margin in those areas. In the specialty growth with the chemical portfolio that we had -- what we have will be good.

At the same time, if I look into North America -- you heard Judd talk a lot about the fact that even in tough times when commodity prices are driving kind of a flattish market, growers will invest to drive yield and drive productivity. And so our ability to bring the hottest set of germplasm with the appropriate trait package, it has to just be appropriate for the market that they're in. We think we do that better than anyone. So while the market overall might be flattish, we can point to some areas where we're getting price because we're launching a Qrome that has 5 to 7-bushel anchor yield advantage. And we can pay for that. And so you got to look at that -- the mix as well of what happens to our portfolio.

Do we make adjustments to our business model based on the market? Absolutely, and you're seeing that this year. Yes, we've made adjustments for 2019 based on how the season started. We predicted it was going to be a good start, and things didn't turn out that way. And I can't say enough about this team and the way they've stepped up and made those adjustments, and that's North America.

The other adjustments that we're making in Latin America and Asia is how do we go sell more faster, and so those adjustments are globally not just in one pocket. And then finally, you mentioned R&D. And our R&D spend is a function of the portfolio of initiatives that Rajan and his portfolio team along with our R&D team have agreed on is right for where we are right now.

So we try to take a slightly longer look to that investment thesis around R&D, and there will be some years where we've got a trove of successes. And we'll need to step that up a little bit, and there'll be some years where we're making some adjustments in platforms. And it will adjust down, and then there'll be a few years where we look at the differential spending, some of the external spend. And we can adjust it with some things going on in the market. So I think about R&D as a little bit more disconnected from kind of that quarter day-to-day because it's really more tied to the initiatives that we've decided or the right strategic projects to drive the business forward.

Gregory R. Friedman
Executive VP & CFO

Can I just add...

James C. Collins
Chief Executive Officer

Yes. Sure.

Gregory R. Friedman
Executive VP & CFO

Just a couple of things. Yes, we showed our forecast for growth, but we also showed our assessment of what we think the market growth is.

So if market growth doesn't turn out to be in that 2% to 4% range that we set out, our assessment is that we will grow 1% to 2% above market. So that's whatever the market points at being.

We have a couple of things that are helping us do that. Jim mentioned them. First and foremost, we have new products that we're launching, a lot of them. And by the way, when we launch products, they tend to bring up over the next couple of years. And we've got a couple that are starting to really ramp now.

The other thing that we have to our advantage is our synergies. We -- given the seasonality and the timing of how our products get into the market, those synergies are going to continue to benefit us for several years to come. So those synergies will continue to pay dividends to the business from a cost perspective.

Then I think the final thing here is the new productivity initiative that Jim mentioned. This is something that all of us here are focused on: driving further productivity into our cost base. And I think that's also going to benefit us as well.

Neal Gutterson
Senior VP & Chief Technology Officer

Maybe just add one more quick point. I mean clearly, Rajan's team and my team look at the portfolio overall, right? We make some adjustments on an annual basis, but remember our product development is a, basically, very long life cycle process, right, and breeding maybe 7, 8, 9 years to bring a product to the market. Chemistry might be 10 years from start to finish, and so we're looking at pretty much long trend lines in terms of market development that link to these long-term asset creation that we have in the R&D organization, a little different than some other industries I think for sure.

Megan Britt
Investor Relations Director at DowDuPont

[indiscernible]

Unknown Attendee

Can you just talk about how you expect the stand-alone costs to look like in 2020, 2021 or some of these kind of other costs or work-through accounting adjustments, IT synergies? Just some color there would be helpful.

Gregory R. Friedman
Executive VP & CFO

Well, from the -- on the stand-alone costs, this year, that $50 million to $150 million of cost reduction is primarily focused on that line. We will continue to identify additional productivity and reduce costs out of the system as we start to deploy our modules in ERP but also as we start to deploy some of the productivity programs that Jim mentioned on his slides.

So a lot of that cost is going to be eliminated over time. The ERP system on its own over the course of the 3 or 4 years that it takes us to bring that up to speed and deploy it throughout the company, that in and of itself is going to be a couple of hundred million dollars of benefit directly to that stand-alone cost line. But that will take some time.

So when we provide guidance for 2020, like Jim said, later this year or early next year, yes, we'll give you some thoughts on the impact of that productivity work.

Megan Britt
Investor Relations Director at DowDuPont

[Joel?]

Unknown Attendee

Joel from BMO. Not getting into legality of it and everything going on the courts. If we get into a world where glyphosate use becomes less pervasive because of tolerance, building up resistance, excuse me and other things going on in the media, what does the R&D platform look like? What does the future of Corteva look like as you've got to kind of shift out different products to farmer-driven solutions?

Judd O’Connor
Vice president of the North America Region

Well, we know first that, that's happening already, right? There are areas of the country where glyphosate has some usefulness, but it's much less than it has been which is why we're seeing additional modes of action with herbicide tolerance on board. It's why the E3 system was -- it's got glyphosate but also a glufosinate opportunity as well as the 2,4-D and our Colex technology.

So the world is moving towards multiple modes of action and multiple opportunities to not only preserve and protect the traits we already have, but begin to get out ahead of some of these resistance and performances. So I'll maybe let Neal say something about our pipeline. We've got additional modes of action that we're working on to solve for that equation in addition to the products that we have right now.

Neal Gutterson
Senior VP & Chief Technology Officer

Yes. I mean Rajan showed you at the bottom of the corn and soybean strategy that there's multiple-mode-of-act herbicide tolerance packages that we've built in to the longer-term pipeline. And even beyond that, there's even an earlier stage, discovery work on new mode-of-action herbicides. So yes, that pipeline is rich, provides multiple opportunities. And I think we can deal with that world in the future in a very good way to be honest.

Timothy P. Glenn
Executive VP & Chief Commercial Officer

I think you have to go back to the tools that we have available. I mean we have the existing tools and technologies, and I'll use example. 20 years ago, if you planted Roundup Ready soybeans in U.S., it was -- you planted it, 32 ounces, 32 days later and that was it. Pretty simple. That was the prescription. 20 years later, it's not that quite simple today. And it's because of that constant change that we face where there's resistance building or just a shift in terms of weed pressures that we see. So we have to go back and use the tools we have, and that's how we've been dealing with resistance up until now and then, obviously, also continued to innovate to bring new tools and -- but when I made the comment about farmers are going to pay for value that they see when they have really difficult challenges, they need advice, and they need good quality products and service. And I think that we are well-positioned to do that.

Megan Britt
Investor Relations Director at DowDuPont

So I think we have time for just a couple of more questions. I'm going right here in the middle with Mark.

Mark William Connelly
Stephens Inc., Research Division

Mark Connelly from Stephens. Two things. I hate to harp on the seed growth rates, but we used to be accustomed to seeing just the germplasm up would give us 3% to 5% in corn. It feels, as you talk about the short-term pressures and even some of the midterm pressures that maybe that germplasm uplift is less valuable. So maybe if you could help us understand and then medium term, how you're thinking about that 3% to 5%. Because when I hear all the things that are being launched here and licensing revenue come in and germplasm upgrades, that 3% to 5% doesn't feel really very aggressive to me.

James C. Collins
Chief Executive Officer

I don't know. Tim, do you want to.

Timothy P. Glenn
Executive VP & Chief Commercial Officer

Yes. I would say there may have been periods of time when we were seeing 3% to 5% growth in terms of the price of seed over an individual year. But I would say that, that hasn't been historic trend.

I think when we bring in new products, new hybrids -- and I'll use the generic number and say that each year, we're renewing our product line with -- about 20% of the lineup is new products that would come in. Those products on an individual basis get priced off the value that they bring. And generally speaking, they are priced at that sort of a level above the products that they replace. So we're still seeing that.

There's no doubt we've been in several years of highly competitive market conditions. We've seen farm income go down, and obviously, driven by the price of commodities. But farmers are still demanding new and better products. And by and large, we've been able to protect that value. And they stuck with us and want those new and better products as we bring them forward. So we are still seeing that sort of a lift as we cycle through new products, but there was a period of time when I would say that there's maybe some unnatural movements that were happening at the market place. But over the long run, we still feel confident that we're going to be able to get paid for bringing new and better products in to the market.

James C. Collins
Chief Executive Officer

And again, what -- you're focusing on one element of the global market. If I step out of the U.S. for a minute, and I look at what the teams are doing in Brazil, I look at what's happened in Eastern Europe and now what we're able to do in Asia with the new lineup, we're, to Tim's point, pricing for the value that we deliver in a superior product with a superior package. It has that kind of value.

Timothy P. Glenn
Executive VP & Chief Commercial Officer

Technology adoption's still very strong and markets that are adopting hybrids for the first time, we're still seeing hybrids moving in, hybrid use increasing. And so there's still that strong need for innovation.

Mark William Connelly
Stephens Inc., Research Division

So it sounds like those targets might be a little bit conservative, but let me just move on.

From a regulatory perspective, ag input companies both in Seed and Crop Protection have lost a tremendous amount of credibility with regulators across the world, and the regulators themselves have lost a lot of credibility with their constituents. So how are you working to help resolve that issue? Because 7 and 8 years to get a product approved is not a good business model.

James C. Collins
Chief Executive Officer

Yes. I think it's a great question, and this team had a lot of conversation about that: this idea of a new level of transparency and a new level of collaboration with regulators. And I think it starts with just the kinds of conversations and the kind of openness that you have to have. And so we're pioneering some new ways of doing that. We're certainly working differently now with regulators in Europe, and they're beginning to appreciate that.

So the more confidence that they feel in the fact that we're being transparent, nothing to hide and that we can trust that they're working in a predictable, transparent program of reviews and science-based approvals, then the whole trust of that system goes up. And then they can stand in front of their societal constituents and say, rigorous reviews. We believe in this science. These products are safe, and we should launch them.

So we have to earn that trust, and we're working to do that pretty hard every day. I would say, that said, having a program and a set of projects and opportunities internally that raise the bar on ourselves. So we don't have a different standard globally on the kind of products we develop. We develop them to meet the most rigorous regulatory standards anywhere in the world. So if they clear that hurdle, they're going to be registrable everywhere. And that just means we set our own standards really high. So we're bringing the best, safest, greenest, most sustainable products right from the start.

Mark William Connelly
Stephens Inc., Research Division

That's the key?

James C. Collins
Chief Executive Officer

Yes. Absolutely.

Megan Britt
Investor Relations Director at DowDuPont

So I'm sorry, but we're going to have to suspend our Q&A. We're going to give Jim an opportunity here maybe to make some closing comments.

Do you want us to stay up here for your closing comments? I think they're going to take their seats, Jim, waiting probably for that.

Judd O'Connor
Vice president of the North America Region

Kicking us out...

James C. Collins
Chief Executive Officer

Yes. No worries. So thanks for today. We threw a lot of information at you. We'll still have the opportunity to do the tour for those that are here in Johnston. And for those on the phone, hopefully, you're able to follow along pretty well.

This final chart is one that I had used many times already on our road shows. It's kind of the provocation that I make that I believe that Corteva is positioned best in the industry today to deliver on this proposition around shareholder value creation. And like I said in my opening comments and Tim and Judd have reinforced, it starts with our market presence, right? The fact that we have the ability to drive demand globally. You add a very innovative pipeline of products to that and -- that operates with a very balanced portfolio of seed chemistry and digital, and you have a unique opportunity here to drive earnings, margin expansion over the cycle. And that leaves us the ability to drive above market growth. And finally, you put the best team in the industry together to go do that. So I love talking about this chart because I think it summarizes kind of who we are.

That said, we know that this has been an incredibly long process, right? We have been talking to you about this for the last 3 years. We have been showing you a lot of numbers over that time. Just the Form 10 alone and the complexity of that document with all the different standards I know has been difficult to kind of follow along through that process. So with the meeting today and the conversations that you had with Greg, I believe we're now in a position to provide you the cleanest set of numbers and view of our business and financials going forward.

Now with all the weather that happened in 2019 and the currency that we're talking about, and the raw material headwinds that are out there, and then you add trade and commodity pricing and all of the issues there, we recognize that the reported numbers that you've been looking at aren't that compelling from a financial standards perspective. What I believe is that it's not just about 1 quarter of those numbers or even maybe 1 season of those numbers or not even just focusing on 1 product. You really do have to look at us on a global basis, and you have to look at us on a seasonal longer-term basis.

As a matter of fact, if I were staying up here talking to you about 2019, and I had excluded the United States' numbers, we'd be really proud of the top line growth and the earnings growth that is in this business. So what I believe we are sitting at is an inflection point for Corteva going forward. You see this portfolio delivering. Rajan showed you those numbers year-over-year. They're real. Our manufacturing organization is struggling to keep up with the supplies of these products because they are moving.

You heard Judd talk about the Corteva Acre. That business model is working, and we're creating a leverage across seed chemistry and digital that we've never had before. And those are market share gains for those products in that market.

And you heard Tim talk about broad global execution. It's not just about Iowa and Nebraska. It's about a global team that is ready to perform.

And then finally, add up to all of that, this underlying focus on productivity and the synergies tailwind that we have out there. So I still believe we are the most compelling and the most -- and the cleanest investment opportunity in the ag space.
We're confident that we're on the right path to deliver on those promises. And you know what? I can't wait and we can't wait to show you what we're capable of. So thank you for your time today and for your continued interest and support of Corteva, and we look forward to our ongoing conversations.