BEYOND HYPE: DIGITAL TRENDS, SCALE AND EVIDENCE

PRESENTATION AND Q&A AUDIO TRANSCRIPT

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PRESENTERS

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Zachary Baquet:	Good day, Everyone. Hello. On behalf of Feed the Future and the USAID Bureau for Food Security, I welcome you to our webinar, Beyond Hype: Digital Trends, Scale, and Evidence. My name is Zachary Baquet, Senior Knowledge Management Advisor with the Bureau for Food Security and today's Webinar Host. I will facilitate today's webinar, so you'll hear my voice periodically, especially during our question and answer sessions.
Zachary Baquet:	Before we dive into the content, I'd like to go over a few items to orient you to the webinar. First, please do use the chat box to introduce yourself, ask questions, and share resources. We'll be collecting your questions throughout the webinar and we'll pause after each speaker or so for a few questions. The speakers will also answer some questions in the chat box along the way. You'll see that the slides are available for download in the box on the left of your screen, as well as some of the resources we'll be talking about today. Lastly, we are recording this webinar and we'll email you the recording, transcript and additional resources once they are ready. We will also post these resources on Agrilinks.org.
Zachary Baquet:	I'd also like to thank the two folks behind the scenes who make this happen, Adam Ahmed and Adam Shrecengost, who make this smooth as silk. We really appreciate all their efforts to make your experience as good as possible so that you are more focused on the content and not on technical issues. So with that, onward to our presentations and discussion on the Digital Trends, Scale and Evidence, so let us welcome Karl Wurster, Digital Adviser for the Bureau for Food Security who will introduce the session and the speakers.
Karl Wurster:	Thank you, Zachary. Good morning, good afternoon, and good evening to everyone. Thank you for taking time out of your day to participate in the webinar and we're really excited that you're here and you're listening. You'll be actively participating over the next hour, hour and a half. As Zachary said, my name's Karl Wurster. I'm one of two Digital Adviser with the Bureau for Food Security at USAID, myself and Katie Hauser, who's also on the call, on the webinar, make up our small but mighty digital team.
Karl Wurster:	Working with USAID in many countries over the past 12 years, I've had a chance to see really the development and uses of digital tools and technologies grow incredibly and to the point now where digital tools have really changed each of our lives in so many different ways, in our personal lives but also in our work around agriculture, food security, around resilience, around water and sanitation, whatever we might be working on and it's going to continue to do so as we go forward. Today, Katie and I are really excited that we could assemble

such an exciting group of experts to take us really on a tour de force of digital agriculture, looking at current and future trends, exciting and innovative applications, and finally the evidence of impact.

Karl Wurster: Real briefly, the four speakers we have today, I think, will give us this really great look at these different areas. First, we're going to have Ben Addom and Ben is a Team Leader for ICTs with CTA, also known as the Technical Centre for Agriculture and Rural Cooperation. Ben's going to talk about current and future trends in the sector as highlighted in this wonderful report that they recently put out, The Digitalisation of African Agriculture.

Karl Wurster: Second, we'll have Sarah Mackay and Sarah is leads on Managing Strategic Partnerships for Wefarm and Wefarm is a really interesting and innovative company that's really the world's largest digital network for small scale farmers. Sarah's going to show use how Wefarm is bringing small holder farmers together in East Africa and also discuss some exciting new growth that they're looking at in Geographies, but also kind of in their technical areas in their marketplace.

Karl Wurster: Third, we have Jehiel Oliver. He's the Founder and CEO of Hello Tractor and Hello Tractor's probably a company that many of you have heard about. It's an Ag Tech company that connects tractor owners with small holder farmers in need of tractor services and Jehiel will talk about Hello Tractor but then also discuss what I think are some of the most exciting things that they do as far as partnerships and really how they're leveraging some incredible work done by external partners to make a really huge impact in the countries they're working in.

Karl Wurster: Next we'll have Brian King, who leads the platform on Big Data in Agriculture, a global program for the CGIAR consortium, centered on digital transformation and food systems worldwide. Brian's going to focus on looking at that evidence for impact that digital tools have and will continue to have going forward, because that's a huge gap that we have right now, but it's something that Brian and his team are helping us fill. Hopefully, today, we'll show you that digital is truly at a time where we are moving beyond the hype into the practical applications that we can talk about more today, so looking forward to an exciting webinar and I'd like to hand it over to Ben for the first presentation.

Ben Addom: Good day to everybody all over the globe. Can you hear me?

Zachary Baquet: Yes, we can. You sound great. Go ahead whenever you're ready. Thanks, Ben.

Ben Addom: Okay. Sure, so this is Ben Addom, no more introduction. I'll go ahead. I don't know if we can put the question ahead but I have a question for you about the report I'm going to talk about, but before I jump onto the report, I want to talk about a simple framework that you can see on the screen right now. That if you are a donor, you are a foundation, you are interested in agricultural development, this should be good for you to have a good idea about this framework.

Ben Addom: The framework has four components, the first one has to do with Digital Agricultural Solutions and that is what you are going to hear from Sarah, you're going to hear from Jehiel, and what we need to do about that is identify the solutions and then promote them, but this is what we have been doing all these years within the sector. The second component has to do with Big Data and Analytics and this is where the content behind these digital solutions come from, and increasingly, we have learnt that you need to have real time data and I'm sure Brian will be talking about Big Data and Analytics to be able to support these digital solutions. So all the solutions that we know of, the reports, they all depend on this data or content.

Ben Addom: But the biggest challenge within the sector for those of us who have been working is the business case, most of the solutions that we have are donor funded and they don't have strong business model and because of that, we find problem of sustainability, so you need to consider the business case of the solutions. Then the final one has to do with the Enabling Environment, so all other things, strategies, policies, infrastructure, known digital enablers as well, and then knowledge part. So if you are designing an agricultural development initiative and you are thinking of the role of information, you need to start considering this framework, how to take all this into consideration.

Ben Addom: Now let me jump into the report, so the report, I would go quickly. I will talk about the current state. If you can see from this slide, it tells you the growth of digital agricultural solutions over the years and between 2012 and 2018 in Africa, so this report is about Africa. You can see the growth within the period and the detail of this is in the report, so I'm not going to explain and if you go to Agrilink website, you'll see the link to the report as well and video about the report.

Ben Addom: Then another contribution that we made in this report is try to classify these digital solutions into what we refer to as Use Cases, so we have five Use Cases. You know, those who are Advisory Services, Market Linkage, Financial Access,

Supply Chain Management, and the rest. Then one key finding that the report talks about is Bundling, so all the solutions are not just providing a service. We have seen that increasingly, these solutions are bundling, bringing two, three, four services together. So you can see the distribution in this slide.

Ben Addom: Then we also talk about the registration of these solutions, so this slide tells you about how, about over 33 million small holder farmers in Africa are registered by these solutions, from Advisory Services to Supply Chain Management. So you can see that the biggest portion falls within Advisory Services. We also look at geographic distribution of this registration within the African Continent and this slide tells you, especially, if you can see the West and the East, that there are so many solutions in West but the registration is very low. Over 152 operating but only 4.3 million registered to use it, but if you go to East, you see about 146 solutions, with over 21 million, so you see a device of this.

Ben Addom: We also look at the solution types. An interesting feature here is the blue portion where you see a lot of commercial enterprises, but if you look at the percentage of registration it's basically about half of that, so the big MNOs and government deployment, are they registration model, a commercial one? So it's something for us to think about. Another thing to look at is the funding for the sector, we have seen that the sector has been dominated by donor funding over the years and even though we are seeing private sector here investment, this has been a good foundation from the donors and other foundations, but we need to go beyond that. So these are some of the top funders that we came up, but very difficult to get funding specifically for Ag, digitalisation for agriculture. Most of the funding are for agriculture and then a small component of information or ICTs.

Ben Addom: Impact, so evidence and impact beyond hype, that's what the webinar is about. I'm sure Brian will be talking about it more, but it's difficult to find impact, but with this report, we have found some data that show that D4Ag is impacting small rural agricultural productivity income and then when these solutions are bundled, we see greater impact. That is one of the key finding of the report.

Ben Addom: We also look at the potential impact of this sector on job creation and so we look at three levels. Increasingly, we are seeing IT level jobs being created within agriculture sector, we see digitally enabled field agents waiting with smartphones and others on the field, and we are also seeing the digitalisation influencing the agricultural value chain from small holder to commercial sector.

Ben Addom: Some trends, I wrote a blog on Agrilink portal ahead of this. You can read it and get some of the trends in the report, if you don't want to read the 240 page

report, but this slide is a bit complex but this ... we are projection of registration of farmers as we see. That is slightly going to hit about 200 million small holder families by 2030 in Africa but the challenge is not registration, the challenge is the actual use of the solutions and that's what we need to start thinking about, because all these numbers of users registered does not mean that they are actually using the service.

Ben Addom: We also found that as I mentioned about bundling, Super Platforms, are those that are not just bucket list of services but they pool services together, not pull upon each other to be able to provide an ecosystem approach of services to the whole agricultural sector. It's not just a platform that brings market information and services together, but the services complement each other to be able to reach the whole ecosystem. We also saw that advance technologies are coming in behind all these solutions and these are some of the technologies that the solution providers said they are going to integrate into their solutions.

Ben Addom: We have seven recommendations but I don't have time to go through all the seven. I would like to focus on two of them as my time is running out. The first one is to invest in the missing middle. We have realized that there is so much duplication from our registration, so there's a need for a kind of middle way, a middle infrastructure to be developed, a data infrastructure with farmer ID or weather data and then all other service providers can build upon that. So there's a need for government coordination or donors to coordinate this and build that kind of infrastructure at national level across, and then if you are service provider, financial service provider and others, you can build on this infrastructure.

Ben Addom: The other recommendation is about knowledge. Again, with the duplication of all that we are doing ... My timer ... With the duplications of all services and registration, there's a need for a knowledge agenda, investment in knowledge that to inform all stakeholders within a sector to avoid everybody developing a report database.

Ben Addom: I would like to acknowledge all those who contributed to the report, as you can see from this slide we had advisory council from all these high level institutions and then together with Dalberg. Again, the report is 240 pages with executive summary can be reached, can be downloaded on Agrilink website. Thank you.

Sarah Mackay: Should I just start commencing? Do I go or we

Zachary Baquet: Yeah, Sarah, you are up. Go ahead and start whenever you're ready. Thank you.

Sarah Mackay:	All right, okay. Thank you.
Sarah Mackay:	Hello everybody. Thank you for having me here today. This is my first webinar, so I'm a little bit nervous. Please bear with me. My name is Sarah Mackay. I worked for a social enterprise called Wefarm and so I'm going to tell you a little bit about Wefarm, because I would imagine not everybody has heard of Wefarm before.
Sarah Mackay:	I always like to start with his picture when I begin my presentations. This is a small scale farm in rural Kenya. Wefarm is a social enterprise which exists, we connect small scale farmers together and the reason for that is very clear in this picture. If you were a small scale farmer living in a farm like this, it's very likely that you're not going to be very easily connected to the world digital economy, even if you do have an internet enabled feature phone, the cost of data is very high and so if you want to access information, you want to access productive services or a market for your produce, you don't have a very easy way to have a vast amount of choice and easy access to those resources and the people that we all in ... While we're sitting tucked away on the internet can then take for granted.
Sarah Mackay:	That was a challenge that our founder and CEO Kenny Ewan identified a few years ago now and as a result, he set up Wefarm. Wefarm is a digital network that connects small scale farmers to the information product and services and markets that they ... all by SMS. The reason for that is is that although most farmers don't have access to the internet, they do have access to a basic mobile phone, just like the one you can see in this picture. This is in fact a real phone that one of our farmers is actually using. Note the fact that you can't see any of the keys but this farmer's still able to use Wefarm.
Sarah Mackay:	As I said, we began out days in 2015. We started off our service in Kenya. We now have nearly two million users, that is over Kenya, Uganda, and also in Tanzania. The vast majority of our users are in Kenya and Uganda still as we only recently launched in Tanzania. It now takes about six minutes for a farmer to get an answer to their question about anything on their farm. I'll go into a little bit more detail about how that works in a second and our farmers have shared over 354 million messages since we started and farmers aren't just signing up for Wefarm and then not using us. In fact, our monthly engagement with Wefarm are higher than Twitter, at 17% in comparison to Twitter's 11%.
Sarah Mackay:	How does Wefarm work? When it comes to accessing information, a farmer will text a question to Wefarm for absolutely for free and then we have machine learning algorithms at the center of our platform, which analyze absolutely

everything about that message, the content, the language, the location of that farmer and then our machine learning algorithms identify the farmer in our ... or the set of farmers, the group of farmers in our network who are best placed to answer that question. The question usually gets sent between 10 to 12 farmers, but if it's a very complex question, we'll get to that question. It may get sent more than that.

Sarah Mackay: The farmer will then receive two to three answers straight back to their mobile phone to that question and at the moment, as you can see, we are managing to share information, there's a huge scale and there are over 40,000 questions and answers going through our system every single day. That's in five different languages and that is including local languages, there's two local languages in Uganda, Swahili and English are included in those. It takes about ... Farmers receive an answer to their question within about 78% ... 78% of their questions are answered within one hour, and that is on a whole range of different topics. Actually, anything from pests and diseases to climates, to markets and really, they're empowering farmers to seek the information that they need, to both resolve the challenges that they're facing and also to improve their productivity.

Sarah Mackay: One of the things that we see day in and day out, over and over again, is farmers asking for access to products and services. So they ask questions like, "Where can I buy the best fertilizer for my farm," "How can I source a solar irrigation system," and as a result of that, what Wefarm would like to do next is not only connect farmers to information, but also connect farmers to products and services through Wefarm.

Sarah Mackay: In January this year, we started to pilot the Wefarm Marketplace. The Wefarm Marketplace is a digital voucher system which enables farmers to access products and services at a discount through their mobile phones via SMS. The way that works is we have a number of different products and services available to farmers. We're able to negotiate on behalf of the collective two million farmers we have on our system to negotiate a good price for those products and services and the farmer will hear about their availability in a number of different ways. That is through the radio, through our kind of boots on the ground and through to SMS and if a farmer would like to buy that product or service, they simply send a voucher code to Wefarm and they receive a digital voucher straight back to their mobile phones.

Sarah Mackay: At the moment, we're focusing on connecting farmers with agricultural inputs, so that's everything from seeds to fertilizers to anything you can imagine a farmer might need to improve their productivity. We're also branching into being able to connect farmers with non-agricultural products, so we've started

piloting with providing access to cooking stoves and also solar products. Ultimately, we would like to be able to use the same system that we're using to connect farmers with a market for their produce at the other end. We would also like to be able to connect farmers with financial services, so with loans and also with insurance, so that a farmer can access absolutely everything they need to improve their own productivity using the technology they have in their hands right now.

Sarah Mackay: As I mentioned, we've started piloting the Marketplace in January this year, it's going very well. We're piloting in two small regions in Kenya and a larger region in Uganda. We have already sold over $1.5 million worth of product and services through the Marketplace. To show the kind of scale of that increase, the growth curve here on this slide is actually the real growth curve. In January, there was $1.5k of sale going through the Marketplace and last month there was nearly $500k of sale going through the Marketplace and farmers, to really, the way I mentioned that farmers aren't just registering and using Wefarm once for information, farmers are also coming back time and time again to buy their products and services through Wefarm.

Sarah Mackay: 54% of our customers have come back to buy twice and nearly one in four farmers are coming back to buy four times. This is a great photo of an activation that was taking at a retailer who had just come on board to our Marketplace. As you can see, this is the amount of demand that we're able to drive to this retailer, who had never had quite so much in his life as the day that he became and activated onto the Wefarm Marketplace. We've had all sorts of stories from other retailers saying how they invest in new premises, doubling the number of fertilizer bags they sell and we see there's an enormous amount of benefit also for the retailers involved in the Wefarm Marketplace as well.

Sarah Mackay: Finally, so the plans, our plans for next year is to really, really increase the number of farmers who are able to access our Marketplace in Kenya and Uganda. We're looking to also launch our Marketplace into Tanzania where it's not already available just yet. At the same time, we're looking to launch and scale Wefarm to new areas across the world, so that includes countries across Africa, but also over into Asia, to try and launch Wefarm into a new continent. We are really excited to move into 2020 to see how much more of an impact we can have together by working with small scale farmers and all of the regions and people being brought together to improve their prosperity. Thank you.

Zachary Baquet: Thank you, Sarah, appreciate it. Now we're going to do a Q&A. If you have questions, please type them into the chat box. We have one question from Nick Weaver, sorry if I mispronounced that. "Hi, Sarah, have you done any research

into the impact that access to Wefarm Marketplace has had on small holder purchasing patterns? I.e. are People buying more because they're connected?" An additional piece to that question is, "Or are people buying through you instead of other more traditional channels because it's more convenient, easier, but not necessarily more?"

Sarah Mackay: Great questions. Okay, so in terms of impact measurements on the Marketplace, we're still quite early days, as I've mentioned. We're only in two very small regions. We haven't done any specific impact management but we have been gathering feedback from enough of our users to make sure that we continue to improve the service for our users and we do plan to add a lot more detailed impact measurements into that area. Specifically, what I would like to look at is creating a specific bundle of inputs that are strictly beneficial to farmers and analyzing the number of farmers which are now accessing that bundle of inputs to demonstrate the impact that has had on their productivity.

Sarah Mackay: In terms of the second question, just remind me what's second question?

Zachary Baquet: The second part of the question was ... Hold on ... "Or are people buying through you, instead of other more traditional channels because it's more convenient, easier, but not necessarily buying more?"

Sarah Mackay: That's a good question, yeah. I think that would be an assumption that we would make is that ... A lot of other times farmers are buying through us in particular because they're getting a better price for the product or services they're looking to buy, but also what we're trying to achieve is delivering greater choice for farmers, so enabling farmers to have access to a breadth and a depth of products rather than just having to be able to only buy the one product that they always buy and that, so that we're able to, yeah, to deliver that improved choice and also improved quality to our farmers.

Zachary Baquet: Okay, thank you, Sarah, for the next question we've got Anne Swindale. "Sarah, have you done any analysis of the accuracy of the answers to questions?"

Sarah Mackay: Yes, the analysis that we do is we ask our farmers to write the quality of the questions that they received, so that's taken into account in our machine learning algorithm. So a little bit like we are all very used to the rating system we have online at the moment and when we use the internet, we use the same kind of process with our farmers. We ask farmers if they found the information useful and they let us know yes or no and that information would then make sure that that farmer who's provided a useful question will be more likely to

receive a question in the future. So that way, we're able to peer rate the quality of the questions that are in our system.

Zachary Baquet: Thank you, Sarah. Another question from Kathy Feery. "Could you describe your methods for updating the topics, pests and disease, climate, markets, et cetera, please?"

Sarah Mackay: I'm not sure if I understand that question, for instance updating the topic.

Zachary Baquet: Okay, yeah, Kathy, if you could provide clarification in the chat box, that would be great. I'll go to the next question from Roshan Hannah. "How do you identify the farmers that answer the questions?"

Sarah Mackay: Yeah, actually, that's a very good question. So there's lots of different parameters are taken into account by the machine learning algorithm. One of the important things is the time of day that farmers tend to answer the questions, so that we can make sure we send questions to farmers when they're likely to respond, so we make sure that we get a good answer in time. Another of the parameters I just mentioned is one, is then farmers are rated by their peers on the quality of the answers they provide. The farmers who are more highly rated by their peers will receive more questions via the system.

Sarah Mackay: Also we have a lot of other circumstantial information about farmers that, say for example, the types of crops that they farm or their location or their language, so again, depending on what the question is, we'll make sure that that question is kind of directed to a person who is best equipped to answer that question. Perhaps they farm that type of crop that the question is about, that they also they speak the language that that farmer is asking the question in and, yes, that all of those different parameters are all taken into account by our machine learning and to make sure that farmers get the very best quality answers they can, as quickly as possible.

Zachary Baquet: Okay, thank you. Just to let folks know, if you have questions for our first speaker, Ben, you can ask those as well. Please let me know in the chat box if your question is directed towards Sarah or Ben and next question is "What is the business model for the peer to peer advisory services that Wefarm provides?"

Sarah Mackay: That's also a very good question. Sorry, I should have mentioned that in my presentation, actually. The business model for the information service for Wefarm is always free, so it's always free for farmers to use, but the way that we are a financially sustainable company is through as we start to introduce the

	Marketplace, the way Wefarm generates income is when a product or service is sold to a farmer, Wefarm receives a commission from the company who sells that product, so that's how we are starting to generate revenue. It's going to be one of the first revenue generating machines that we are putting in place, looking to add in new revenue generating streams in the future.
Sarah Mackay:	But at the moment our funding, the way we exist is through venture capitalist funding, basically, grant funding as we get our revenue stream and our financial model working and fully off the ground.
Zachary Baquet:	Thank you, for the next question from Lucy Swain, part (A) is "Are there any incentives to farmers for answering questions," and (B) "Are SMS free to send?"
Sarah Mackay:	Yeah, great, so great question, so yeah, SMS is always free for farmers. It's free for farmers to ask questions, free for farmers to answer questions. In terms of incentives for farmers to answer questions, no, there's no specific incentive. We do use gamification so we have what we call the Champion Farmer Initiative, so this runs once a months and farmers who are top ranking farmers so they answer the most questions with the best feedback. We select on or two every month as our Champion Farmer and they will receive a prize which is usually in the form of a bundle of farm inputs and often we invite them to come and speak on a radio slot.
Sarah Mackay:	So yes, so when we talk to our farmers, a lot of them tell us that they actually really enjoy answering questions on Wefarm. They very rarely get asked for their expertise and knowledge. Many have told us they find it actually very addictive. We've had some farmers who've answered thousands and thousands of questions in the period of time they've been with Wefarm.
Zachary Baquet:	Okay, thank you. Next question is from Job [inaudible 00:35:14], sorry if I mispronounced that ... From Kenya. "Do you in any way promote market linkages for these farmers and is Wefarm helping in job creation Kenya?"
Sarah Mackay:	So good question, so market linkages, yeah, absolutely, that's in our roadmap. We would absolutely like to be able to enable farmers to sell their produce through Wefarm. So but the moment, the system, that we've developing is more on the input side, so being able to buy, but we're hoping in the next 12 months to be able to flip that round and use some of the technology and the networks that we have in place to enable farmers to start to sell through Wefarm.

Sarah Mackay:	Yeah, definitely, we know that that's one of the biggest challenges facing our farmers and so something that we're really committed to doing as soon as we can.
Zachary Baquet:	Excellent, another question from Anna Brennis is "In an earlier question regarding how you identify farmers, you answered that a machine learning algorithm was being used in part to do this. Is this algorithm based on call data records, geolocation? Are there challenges with this based on National Government Privacy Laws?"
Sarah Mackay:	Okay, so that's a good question. We gather the data that our farmers, about farmers on our database, but obviously, that is all protected by the GDPR Privacy Laws, so obviously, we make sure that we're very careful with how we look after that data. Absolutely, yeah, that is aligned with all of their National Government Privacy Laws because we are a UK company, so we're governed by some very, very stringent GDPR laws. So yeah, in answer that question, absolutely 100%, there are the data [inaudible 00:37:08] and absolutely very, very important to us and we make sure that we safeguard that very, very carefully.
Zachary Baquet:	Okay, we'll have time for one more question and then we'll move on to the next speaker and so this last question is from Faven Nadu, "Are you able to monitor productivity changes that farmers achieve from the provision of your services?"
Sarah Mackay:	Yeah, that's a really great question, yeah, absolutely. The way we monitor that at the moment is through surveying our farmer and we've done a number of surveys with farmers and found that between 70 and 80% of farmers that we ask have either been able to increase their productivity or they've been able to increase their farming knowledge which has resulted in an increase in productivity. Yeah, absolutely, we're definitely seeing we're having that positive impact on our farmers.
Zachary Baquet:	Okay, thank you. With that, we'll move onto our next speaker Jehiel Oliver who'll be presenting next, and keep providing your questions in the chat box. We will have a question and answer at the end of this session and so we'll get back to questions that we missed and try to get answers for you.
Jehiel Oliver:	Thank you for the introduction. Again, my name is Jehiel Oliver, I'm the CEO of Hello Tractor. Hello Tractor's a agricultural technology company that connects tractor owners to small holder farmers in need of tractor services and these are typically individuals that are willing and able to pay for tractor services but due to the nature of their farming and the size of their plots, they can't afford to

own their own equipment. So we get them connected to our market place of equipment.

Jehiel Oliver: Is the slide moving? Can you all see the slides are there?

Zachary Baquet: Jehiel, it's the Main Presentation Pod One.

Jehiel Oliver: Okay, so I think I figured it out. I run a technology company by the way. The mission of our company is to fundamentally we want to improve farmers' lives with our agricultural services platform and while that may sound simple, there are some intricacies there. First off, the farmers that we service are small holders and many of these farmers plant manually, because they don't have access to equipment and this manual labor is significantly more expensive than mechanization. It's also slower, which means they oftentimes plant late and under cultivate their land. This all leads to reduced yields.

Jehiel Oliver: For every day that you plant late, in a rice system, for example, you lose anywhere from a point to a point and a half in yield and so what a tractor can do in a few hours, it takes a human almost a month, so you can imagine the decreasing yield that results in that. So you have to ask yourself, "In such an environment where tractors are needed, what is preventing the market from responding to this demand that makes financial economic sense?"

Jehiel Oliver: The answer to that question is most tractor owners are challenged by providing profitable tractor services to this market of small holder farmers. It's due to the fragmented nature of the market. Small holder farmers, in addition to having small plots are typically disbursed across large geographic areas, particularly in Sub-Saharan Africa, but also tractor owners make these massive investments in these equipment but they're oftentimes not the drivers of the machines. They hire drivers and so oversight and fraud are issues. Tractor drivers will take machinery out and under report the work that they do and pocket the profits for themselves.

Jehiel Oliver: The last piece is poor after-sales support and because there's a dearth of tractors and most dealers operating in the market aren't selling at economy scale, it's difficult for them to manage their spare part supply chain and make sure they have enough trained technicians on staff, because there's just simply not enough tractors being sold to absorb the cost of building up things like a robust spare parts supply chain.

Jehiel Oliver: Hello Tractor responded to these challenges with a technology solution and at the center of our solution is data harnessed through IoT technology. We make

this data available to the customers within our ecosystem, which includes farmers, contractors who are managing their equipment, banks, who finance the tractors, and, of course, dealers who provide the after-sales support.

Jehiel Oliver: We make this data available in a series of applications that we've developed in house, and again, it starts with Telematics device which pulls the data off the tractor and then makes it available in a mobile and web application that our truck contractors can use to manage their equipment, manage bookings coming in from the marketplace, manage their operators, the maintenance needs of that tractor or their fleet of tractors and the fuel being consumed.

Jehiel Oliver: Then lastly, is the booking application, which is a separate application that can be used either by farmers or more often than not ... that book on behalf of farmers, and the agent plays a really important role. They organize demand in the market and aggregate that demand so the bookings come in at economies of scale. When those bookings come in, our technology pairs those bookings with the nearest tractor that is available with the applicable implement. The technology also sorts through the bookings to ensure that the bookings are large enough to be attractive to ... Financially attractive to the tractors on the platform, based on the proximity of those tractors to the bookings coming in.

Jehiel Oliver: Because we're building out this platform and there are so many different gaps in the market, we also work very closely with other technology companies to build out additional features, additional capabilities to service our market. Most recently, we partnered with IBM to develop a product to better finance tractors using artificial intelligence and predictive capabilities to not only identify good borrowers who should receive a loan to buy a tractor or increase the size of their tractor fleet but also once that loan is made, the technology helps the banking institution or non-banking institution to understand the risk and the probability of default.

Jehiel Oliver: We also work with companies like John Deere on the equipment side who help support market development. There's some shared interest here, obviously, but then also companies like Bosch, who support on things like predictive maintenance and so the market is so complicated and so large, and the gaps are so big, we really do rely heavily, a Karl kind of alluded to earlier, on these partnerships to bring the technologies to the marketplace and bring more fluidity to the ecosystem.

Jehiel Oliver: And you've got to excuse the, I think, the PowerPoint slides' got a bit distorted during the uploader but, basically, the technology is in the platform, in the work that we've been doing through our contractors have resulted in farmers being

able to increase their yield significantly, over 60%, roughly 60% of our farmers have reported higher yields, but then there are also other benefits as well, sort of engaging on the platform. Also contractors report higher profitability of their tractor fleet and oftentimes increase the size of their fleet due to the profits being generated and the ability to secure those profits through the technology.

Jehiel Oliver: We've been at this for about five years now. The team has now grown to 22. We're in 13 countries, 11 of which are in Africa, and then we also briefly launched in Asia. We have 24 tractor dealer customers and I should mention that we sell directly to tractor manufacturers, but we also to tractor dealers operating in the market and then lastly we sell to the secondary market or after market, which is existing tractors. Then the last customer segment would be banks financing tractors and we've got some great market uptake, we've grown to ... We're approaching now 3,000 tractor on the platform and it's a huge opportunity. It's a 17 million tractor market, and that 17 million represents just compacting utility tractors, which are sub-100 horsepower technology.

Jehiel Oliver: Our technology's very well suited for this segment of the user, customers that often buy tractors as business assets, so a lot of upside there. The way we see entering into a market and growing a market, we first go into any country and go after existing tractors in the marketplace, getting our technology onto those tractors, improving service delivery to the farmers with that existing inventory and as farmers crowd into the market, this leads to improved process and more investment into additional tractors to grow the size of these fleets. That wheel continues to turn and we look to continue to increase the number of tractors in any given market and close that mechanization gap.

Jehiel Oliver: This is the team, or at least the leadership team, with the exception of Martha Haile who works for Wefarm, we're really excited about that ... Because we see Wefarm as a potential partner and they look to build out their platform as well. With that, let me pause there and open up the conversation to some Q&A.

Zachary Baquet: Thank you, Jehiel. Appreciate it. Thanks, everyone, for providing questions. We'll start with a question from Dickton Lee. "Working with small holder fields, what is the loss in tractor efficiency and do you require farmers to group fields to increase efficiency?"

Jehiel Oliver: Absolutely, it's a great question. We absolutely require clustering of farmers when bookings come in and there's no tractor nearby, and so our booking algorithm makes that assessment and if there is no tractor nearby with the applicable implement that is required for that farmer's job, then the system prompts that booking to be coupled with other farms until that critical mass is

reached. At which point, the booking can then be paired to the nearest tractor, ensuring that service delivery is profitable for the tractor owner.

Jehiel Oliver: Because you have to keep in mind, we're working in the double sided marketplace and it has to be a win-win on both sides, and so the technology helps to support that decision making and ensure that efficiency in the market. I hope that answers your question.

Zachary Baquet: Okay, thank you. We have a two part question from Ralph Shinkel. "Is this technology also applicable to the very popular Indian and Chinese two wheeler tractors, one, and then secondly, large parts of Africa, growth of labor force grows much faster than economic growth. There doesn't seem to be a labor problem, how would widespread introduction of this technology contribute to the high demand for labor?"

Jehiel Oliver: Yeah, I think, the only thing I would add to that question, Ralph, is Africa also as a region has one of the highest urbanization rates globally and so when you think about the labor force available for agriculture there are shortages in these markets. As a result of that, many of the farmers under cultivate their land and they plant late because they simply don't have the labor necessary to work this land resource that they have access to. While unemployment rates are high at, say, a country level, when you drill down to the agricultural economy in these rural areas, there are labor shortages and of course tractors can fill that power gap, but of course, systems need to be brought in place, as well as fresh capital to finance ... The equipment is financed, we want to make sure that the equipment is optimized and that's our role.

Jehiel Oliver: As far as the two wheel tractors are concerned, we actually look very closely at the South Asia Model, we also looked at manufacturers], who've done very well in mechanizing small agriculture in Asia. What we learned and we certainly have this equipment on our platform. The most common equipment is going to be your 55 or 75 horsepower, but we do have some of these low horsepower two wheel tractors as well. What we've learned is these tractors work very well in wet paddy rice systems, because they're not as durable, so you have to be careful about the soil environment in which you deploy this equipment.

Jehiel Oliver: Also, the density of farmers that you deploy the equipment into. You think about Bangladesh, for instance, if you compare it to Nigeria where we started, Bangladesh is about nine to 10 times more dense and so as a two wheel tractor owner, you have 10 times the customer in your immediate vicinity and that's important for this category of equipment, because they don't travel as well. A two wheel tractor, you can't really take on the road long distances like you can a

four wheel tactor, so the density ... farmers and the crop system are going to be really important. We've seen that work well in high density environments, where wet paddy rice may grow.

Zachary Baquet: Okay, thank you, our next question kind of covers a couple of different questions that we've had from [crosstalk 00:52:53] ... Pardon? From Mary Lucy [crosstalk 00:52:58] ... Yeah, yeah, from Mary Lucy, "What countries in Africa are you in? Is there a map showing those locations?"

Jehiel Oliver: Should be a updated map on the website. We're currently in Nigeria where we started, in Kenya where we recently opened our second office. We're in Senegal, we're in Ghana. We're in Tanzania, we're in Uganda. We're in Malawi.

Zachary Baquet: Okay, next question ... Roshan Hanna, "What sizes are your tractors? Small holders can have very small plots in hard to access locations. This is where the poor small holders would be, how would you get a tractor there?"

Jehiel Oliver: Yeah, so the average tractor on our platform is going to be a four wheel drive, 75 horse power tractor with typically land prep implement and, you know, I've mentioned the important role of booking agents. I would say, their job is threefold and these are really important points here, the first role is to identify and cluster demand, so it comes in in economy of scale. That means small farmers can book on the platform but they organize into groups. When a tractor drives 50, a 100 kilometers down the road, they have enough demand to justify the journey.

Jehiel Oliver: The second role is going to be around payment and ensuring that the payments are secured before the tractor [inaudible 00:54:35]. Typically what happens is farmers pay 50% upfront with the balance paid upon service completion and the booking agent's job is to make sure that happens. The third one and this speaks to the question, the second half of the question, is ensuring that the farmer's plots are accessible for the tractor, because obviously road networks are questionable in some of these rural communities and so the booking agent's job is to also make sure that the tractor can physically get to the farm and for delivering this service that's so mission critical to this marketplace, the booking agent is paid a commission that varies from country to country but averages around 10% of gross booking completed.

Zachary Baquet: Okay, thank you, next question from Dr. Lynn Eickler, "Do you have a process where a group of farmers in an area can own a tractor and share?

Jehiel Oliver:	We see that. We see cooperatives using out technology to manage small equipment fleets that are kept within a closed network. We also see large outgrower schemes and large producers who work with small holder farmers who need the technology to manage equipment within this closed ecosystem and so it's a mixed bag. I would say the overwhelming majority of our customers would be people who own the equipment as business assets and deliver services primarily, but of course, we do have cooperatives, outgrower schemes also using this technology to manage these assets.
Zachary Baquet:	Excellent, one last question, before we move on to the next speaker, from sort of a follow up to this last question, Godfrey Suamon is asking, "What challenges are you facing while working with farmers' organizations?"
Jehiel Oliver:	What challenges, wow. No shortage of challenges, Godfrey, but I will say, one of the biggest challenges is there's such pent up demand for these services, oftentimes, holding our contractors accountable is, I would say, one of the biggest challenges because the contractors can easily be distracted by demand coming from farmers that maybe financially more attractive just serving and so the way we respond to that is improving on everything from [inaudible 00:57:21] optimization to curating demand in such a way where despite it being small holder farmers being serviced, [inaudible 00:57:28] where you are receiving a net net at the end of the season, more money servicing the farmers that we bring, versus ones you would find on your own by just parking your tractor in a marketplace and waiting for farmers to come.
Jehiel Oliver:	I would say, the reliability of the contractors is going to be a big part of that. We've also instituted some stronger training programs to enforce higher quality service delivery and with the new financial products that we're launching, to finance tractors, we can enforce more quality service and reliability amongst the contractors because we now have more control.
Zachary Baquet:	Okay, thank you, Jehiel. We're now going to move on to our last speaker, Brian King, with CGIAR, and then we will have a final Q&A after that, so with that, I hand it over to Brian.
Brian King:	Thank you, Zachary. Hi, Everybody, so yeah, my name is Brian King. I coordinate a program called the Platform for Big Data in Agriculture, for the Global Research Consortium CGIAR. We're 15 censors, we're in about 70 countries and we do research into virtually every aspect of food security from genomics and genetic resources through on farm research, crop improvement, the socio-economic or climatic context of agriculture and food security.

Brian King:	What I want to speak a bit about today is a bit of a kind of higher sense making level and sort of how we're going about trying to do that. Those of us who work in this sector, which sounds like everybody who's attending does, can't not notice that there's a dizzying array of digital interventions in agriculture and that even those of us who do it for a living can find it challenging sometimes to keep track of the array of technology, the array of actors' entry points, in food and farming systems and the actual effects of those digital tools in technology at all of those different facets that I mentioned.
Brian King:	And so ... Oh, let me see, how is it advancing here? Does it ... Ah, there we go. Yeah.
Brian King:	Now those who work specifically with digital technologies will recognize this graphic from the technology consulting firm Gartner, who every year plot out essentially the kind of irrational exuberance that is kind of the feature of the IT in tech sector, in a sense that a new technology emerges, there was a lot of really great excitement about the potential of that technology, some overblown or inflated expectations about the technology, those hopes are almost inevitably dashed and at some point that technology kind of stabilizes and finds its place in the overall sector.
Brian King:	It's important to note that ... I mean, this is a feature of our sector and it's something that we need to be very intentional about managing and that also means that for digital agriculture, there's gong to be a perennial evidence gap, because digital technologies will be going through this sort of churn, and so what we need to be doing is building the evidence base in a way that is comparable, in a way that we can agree at a minimum sort of how do we want to structure it, how do we want to describe things, and how do we want to begin to start to extract some lessons that can be of more general use and we can sort of be putting evidence into the service of our common goal, which is accelerating and securing the benefits of data and digital tools in development agriculture.
Brian King:	This is something we set out to do a few years ago when I had the privilege of being part of an initiative at USAID, between the global development lab and the Bureau of Food Security called Digital Development for the Feed the Future and one of the things we realized, you know, the expanded cross zero teams there or inter bureau team there, was that no one that we knew of had really gone through the exercise of running down all of the leads out there both from business [inaudible 01:02:35] or things we heard about through our own contact networks, some lit review, and go and just sort of take a look at the evidence

and plot out or map those bits of evidence to the traditional kind of agricultural value chain segment.

Brian King: We went through that exercise, it was 300 and some bits of evidence and we arrived at about 40 that we felt were pretty credible and that was a measurable value add of data or digital tool and contributing and mapping through at least one of the value chain segments. You know, we learned a few things along the way about how do we sort of manage that hype cycle or manage the hype. You know, the specific potential benefit, the specific value add that a technologist or a project or a start up is trying to claim is sometimes needs to be a bit better to find and certainly for development practitioners, you know, we need to be looking very specifically at where do we think this digital intervention will be better than another more mature digital intervention or another existing technology or process out in the target environment.

Brian King: We heard a lot today about these overall ecosystems I mentioned from Ben, from CCA, they've been great examples, you know, but just recognizing that there are a whole bunch of exogenous factors to the digital intervention that are important for its success and has anything been quantified already about that intervention and so fast forwarding a few years at CGI or now and in the last six months we ... Took actually a little bit longer, about eight or nine months now, we sort of took a look back at that effort from D2FTF, from that initiative and decided that it would be great to try to create a more enduring home for that effort and to do it in a way where we could engage the global network of CGIAR partners, put out calls for evidence and we could start to like capture and collate in a comparable way.

Brian King: What we decided to do was to frame it much more a bit ... Let's see ... Anyway, we decided to frame it as in terms of the food systems framework, rather than a traditional ad value chains and one of the reasons we did that is that nutrition and consumption are pretty fundamental to the kinds of impact that we're seeking to have, that aren't typically captured in the traditional value chain approach. Also, the recognition that the interactions between nutrition, consumption, sustainable production, the traditional value chain segment market systems, these interactions are very complex and that increasingly that the really compelling digital models are linking across two or three of those different aspects and we've heard of it about already, from the other speakers that I get a lot of inspiration from, about how we can just be looking at value chains and certainly not just one commodity value chain, if we want to be building the kind of understanding that we need to build to navigate things and build intelligence in our sector.

Brian King: Basically, what we did was there's a big data platform, CGIAR platform for big data evidence clearing house and you can poke around there. We're trying to keep a very low, friction process for soliciting and inputting evidence and basically, you click on a button there, there's a simple Google form and you can put in some things like who are the intended users, number of active users, location, type, and essentially, entry point in, where in the food system, one or more place in the food systems, and what's your project you will be doing. There's another section there specifically about evidence, and we purposefully are interested in capturing both interventions that may not yet have evidence or interventions where something has been measured or is being actively measured.

Brian King: The reason for doing this is that we think that if we can catch enough volume of interventions, that becomes very interesting as well. We could know sort of what technology is being used for what, where, and we hopefully will be able to start to see some trends there, and they can sort of help us collectively stay abreast of what's going. Yeah, there are about, I think the ... You can go and you can filter through the bits of evidence that are in there, or intervention/evidence that are in there right now and we have about another hundred or so in the pipeline that we'll be able to push to it pretty soon in the next couple of months, I think.

Brian King: And so, just some what happens if you go, if you fill out a Google form and press a button? Well, on one hand, we have a couple of people that are a part of this kind of team here at the Big Data Platforms, Maria Camilla Gomez and Jonathan are tending to this. On the backend, Jonathan's an Ag Economist who maintains a good eye out for the state of evidence, for digital and food security and digital and foot systems and this team will be looking at lit review and kind of helping build things up, so Maria, they'll be the first ones who would be able to see when something comes in.

Brian King: We also have communities of practice, technical communities of practice that are about 5,000 members strong, collectively now that are both internal to CGIAR and external, and so we have the ability to, one, call for evidence from those communities, but also reach out to subject matter experts if we feel like something needs to be a bit more ... We need some subject matter expertise to understand that something makes sense. Just a note about the standards for evidence, we purposely set the bar a little bit below what you might consider the gold standard. So a randomized control trial or an impact study would be more in the gold standard realms related evidence and what we found is that it's ... there's probably a lot of measurement or there should be a lot of measurement going on out there that might otherwise get lost.

Brian King: And so what we're looking at is how do we start capturing more of that measurement and as I said, we'll be doing some lit review, so those kinds of RCT and impact studies will eventually get loaded up and put into there ... Okay, let's go ... so what will we be doing with this?

Brian King: We've got ... I mean, first of all, just the Big Data Platform as a global program is itself kind of an offer for trying to make the next steps happen around promising intervention, and so we run a global innovation process called the Inspire Challenge that is specifically about digital and food systems info challenge areas. We have the communities of practice that I mentioned. We have our own global partnership networks and we have a crack communications team that ... Where interesting interventions or interesting bits of impact are emerging. We really want to be able to communicate about those and then help make connections happen.

Brian King: In addition, we hope that this Evidence Clearing House will equip us to do better meta-analysis and synthesis reports so that we can sort of build some more collective intelligence and accelerate the digitization of the Ag development enterprise. Just very briefly, when something gets submitted, a very small vignette is generated. We do have humans in the loop double checking things and so forth, but ultimately what happens is just a sort of little vignette about the intervention and the evidence related to that particular intervention.

Brian King: I want to close, just briefly saying ... I know it's probably second nature or it is second nature to MNE, you know, mind learning and evaluation shops and certainly research organizations to set up very simple study designs, but it's also good to note that a lot of times start ups aren't necessarily thinking that way. Startups are thinking about what they view as their core job, which is capturing customers and building their business, which is completely understandable and so just to underscore that a study design doesn't need to be super onerous and if a digital intervention is about to happen, you can think through a few things about that measurable value add or measurable that you hope that that digital intervention is going to bring, and you can capture a baseline and some point in the future you can take another measurement.

Brian King: If a digital intervention is already happened, you developed a great technology intervention and you linked to a few different aspects of the food system and are really excited about the business model that you have as a startup, and you're sort of off to market, it doesn't mean that you can't study at that point as well. You just need to find those indicators about that measurable value add, take those measures in a community where the intervention is happening and

basically go find a control group somewhere that has hopefully equivalent or ideally identical characteristics and take those measure there as well.

Brian King: Then of course, the MNE shops that I mentioned or research organizations like ourselves can of course help with setting up study designs. I think that as a community, we have the reach not just any CGIAR here, I mean collectively, we have the reach, we have the global foot prints, and I venture to say that if we can use the food systems framework and some very simple ideas of study design, that we could really dramatically increase and expand our understanding about how to tailor digital interventions and we can collectively turn ourselves into a global research infrastructure that really accelerates the changes we're trying to have. Thank you.

Zachary Baquet: Thank you very much, Brian, appreciate your presentation. We've got a couple questions from the chat box. The first question from Katie Hauser is "Are you seeing particular groupings of evidence coming through in your pipeline, i.e lots of digital financial services examples, versus precision Ag or is it a wide variety?"

Brian King: Thank you, yeah, I think, well, we've got some different channels so as I mentioned, we have an innovation process that we've run through three full cycles now and so that is essentially we've kind of ... Those are effectively calls for evidence as well when you put out a solicitation for folks to go after innovation finds and so we've got a lot on data driven agronomy, approaches and technologies at least for trying to reveal where food is flowing in food systems, a lot of stuff on test and disease, and so ... but that's been a bit, you know, we've sort of ... Those are effectively calls for bits of evidence when we do an innovation process like that.

Brian King: Similarly, the communities of practice that we run are in different technical domains and so there's that ... That is again another window into some different types of evidence and so what we need to do is through investment and put out some wider calls for evidence and be able to start to make a useful, of generating some of those trends that you're implying that we should be able to see right now. That said, we have learned a lot through those processes and there's a report up called Innovation Strategies for Digital Agriculture, on our publication repository called CG6 that I can provide a link to you because of that insight.

Brian King: Regarding particular evidence gaps, that need to be filled, I think one area that is very exciting right now is embodied by Wefarm and a few others where this digitally intermediated farmer to farmer exchange approach, it needs to be more fully understood in terms of adoption and use of new innovations. I think

it's, to my mind, it's one of the most exciting things to happen to extension work in the last 10 year or so, the way that digital media are creating, enabling creation of new types of communities around problems and I haven't seen ... We've been looking around, we've been looking out for anything really, to start to see the digital value add of that over other things and there's some that we've been able to source through some of our innovation grants, but something kind of broader and more systemic understanding about that farmer to farmer, kind of digitally intermediated farmer to farmer exchange theme I think is a big area where we'd like to learn more.

Zachary Baquet: Thank you, next question from Rashid Saraj, "Where or what is the public sector's comparative advantage in driving digitalisation?"

Brian King: That's a huge question, so there's a couple of things. I mean on one hand, when we take a digital, say we take the digital lens and we look at traditional extension, Ag extension approaches, on one hand, I think that there's huge scope in terms of just building the digital supports that enable them, digitally enabled advisory and so public sector that includes public sector universities, that includes extension agents, that includes other types of investments and so forth, and so I think in addition to the kind of free, well understood stuff about creating the right enabling environment, I think that help investing in the data assets that will enable both public and private Ag Tech actors, advisers and start ups, and so forth to do what they do better. So I think public sector investment in the digitisation aspect of it would be extremely helpful.

Zachary Baquet: Thank you, Brian. Another question from Anna Brennis is, "Are you using machine learning to fill data gaps, eg. voice call data records, disease surveillance of livestock, et cetera?"

Brian King: So with call detail records, we've got some research going on with Dalbert Data Insights, who hold the use agreements with some of the mobile operators and to be able to access their call detail records and so we're doing some joint research with them, looking at economic empowerment as it relates to agriculture and so that's one place where we're using call detail records plus machine learning enhanced areas.

Brian King: Some of our machine learning enhanced approaches with regard to pest and disease, some of our specific projects do use machine learning and they ... some computer vision stuff for being able to accelerate diagnosis. There's machine learning plus natural language processing learning on one of these horizontal farmer to farmer communities, to be able to both detect and then start predicting animal health trends. There are some cases of that, but its really

needs to link back into the use case and, of course, in each case you have to be navigating what the responsible data dimensions of that data usage.

Zachary Baquet: Okay, thank you, Brian. We'll answer a couple more questions but just to draw your attention to it, those who are still with us, that there are our ending polls. These polls are helping us to improve on our webinars into the future and find out how you found this webinar. We really appreciate you taking the time to answer them.

Zachary Baquet: With that I will go to another question, from Ian Morrel. "Is there any work going on regarding infrastructure improvements?"

Brian King: Who is that for? Jehiel?

Zachary Baquet: Is that for ... pardon me, Ian, if you can clarify who that question is directed for, we appreciate it. I'll go to the next question real quick.

Brian King: He says Brian.

Zachary Baquet: Oh, he said Brian. Okay. Yes, it's towards you, Brian.

Brian King: So yes, I mean that's a bit broader than the specifically the evidence clearing effort, while we're trying to have enough comparable, sort of comparable standards on what kinds of data are interesting and why we think it's interesting for understanding digital and food systems. I mean the program that I lead is itself an effort to improve the overall infrastructure for digitisation in the agriculture and developing economies platform for big data and agriculture.

Brian King: There's a data discovery tool called Gardian, G-A-R-D-I-A-N, that is linked to open data repositories at all of our 15 centers and so as research is conducted, because we're sort of research for development, or research for impact organization, the data assets and the publications are discoverable by Gardian, and so we've got a few of the pipelines built whereby data that goes into Gardian an start to go into our common analytic approaches, you know, the typical thought models that have been around for sometime, making sure that the data meet minimum quality standards to be able to feed in a few different types of analysis.

Brian King: To some degree, or to a large degree, we are right now, a global infrastructure and what we're focusing on is continually building the partners that we're engaging with and just getting that data discoverable and then applied. So right now, data's discovered from several national agricultural research institutes,

USAID, and progressively in country wide, we want to be able to use that infrastructure for building this kind of overall data ecosystem, so there's a couple of steps between there and startups being able to use this, say our Ag extension is being able to use this but I think we'll have some pretty good use cases on that pretty soon as well.

Zachary Baquet: Okay, thank you very much, Brian, and thanks, everyone, for participating. We'd like to start on time and end on time, so with that, thanks to all of our presentors for an excellent webinar today. Thank you for our audience for the very dynamic discussion, the questions, we greatly appreciate it and again, taking a moment to fill out our polls. We do take these seriously and again try to improve upon this webinar experience for you. As we got feedback from our last webinar, folks really appreciate the ability to do more engagement, have more opportunities for Q&A and so for this webinar, we worked with the presenters to make sure that there was space after presentations to do more Q&A and so we really appreciate the time you've taken to answer questions and provide questions.

Zachary Baquet: Thanks, everyone. We hope you have an excellent rest of your day or have an excellent evening sleep and we will see you at the next Agrilinks webinar. Thank you and bye.