



Scaling Agricultural Technologies: Bringing Research to Farmers and the Market

Presentation Transcript

July 24, 2013

Presenters:

Sahara Moon Chapotin
USAID/BFS

Jerry Glover
USAID/BFS

Bob Nanes
IDE

Steve New
Fintrac

Facilitator:

Julie McCartee
USAID Bureau for Food Security

Sponsor

United States Agency for International Development

Julie McCartee:

Good morning, everyone, and welcome to our July 24th Ag Sector Council seminar on Scaling Agricultural Technologies. My name is Julie McCartee and I'm a knowledge management specialist with the USAID Bureau for Food Security. I'd like to welcome our first in-person audience here today, and we also have a large number of people joining online through our webinar. So that's really exciting; thank you for joining.

We have a full program today, so I'm just going to give a couple of quick housekeeping issues. As usual, please silence your cell phones. Also I'd like to remind everyone that we will have a Q&A period after the presentations, and we ask that you please hold your questions until the end so that we can pass the microphone around and the webinar participants can hear your questions. Also, if you would like to follow along on Twitter or Tweet about our event, our hashtag is #AgEvents. So please feel free, especially if you're online, to join via Twitter.

At this point I would normally let you know about next month's Ag Sector Council seminar, but August is our usual hiatus month and we'll be taking August as an opportunity to review the evaluation feedback we've collected over the past year and start planning for the next set of Ag Sector Council seminars. So we'll see you back here in September and let you know when they start back up again.

I'd like to give a quick shout out to Elizabeth Scutgar, who is the technical advisor on sustainable agricultural development with the USAID Bureau for Food Security and a AAAS fellow. She was instrumental in helping pull this event together, and she is also joining on the webinar as a featured online contributor. She'll be helping us spur some conversation in the chat box, so feel free to say hello to her if you're online.

And lastly I would like to welcome Sahara Moon Chapotin, who is division chief for agricultural research at USAID, where she works on the implementation of the Feed the Future research strategy. And she'll give a quick five-minute intro to our topic today and introduce our three excellent speakers. So, Sahara Moon.

Sahara Moon:

Good morning, everyone. It's such a pleasure to see a full house, and I understand we have a tremendous number of people online, so that's really great. We're extremely excited about today's seminar, Scaling Agricultural Technologies: Bringing Research to Farmers and the Market. So our office here in USAID, we've been working on investing in research to develop and locally adapt production, post-harvest, and marketing technologies. And we've been doing this for a long time, as you might expect. Research is a long-time endeavor. However, this has sort of taken on new urgency with Administrator Shaw's direction to us that we really

focus on scaling these technologies and thinking about how we can move the research outputs to the field and get them out at scale. And so we're, through a series of efforts, partnerships, programs, discussions, thinking about how to better do that and how to really catalyze our efforts to ensure that our research outputs are not as he puts it – says it, “Are not sitting on a shelf somewhere.”

So our research investments have spanned the value chain, we have production-focused research saying crop or animal breeding and selection, we have research focused on integrated pest management, post-harvest losses, food safety. We have research on nutrition and market-oriented research which helps small holder farmers realize the promise of that technology, thinking about basically research on how you would do scaling, and finally, we have research on sustainable intensification, how can you pull all the different research streams together in the field in a way that sustainably transforms production systems, and Jerry will be talking about that in a little bit.

So with Administrator Shaw's request to us to our bureau that we really prioritize scaling technologies, we've been working about – thinking about how we can link our centrally-funded research programs and those research outputs to our USAID missions in the field. The many, many Feed the Future activities, the development programs, of course take place in the field, and what we'd like to do is ensure that the research outputs are feeding into those efforts and through those development programs are reaching many more farmers. So we're working with our missions to develop scaling plans, we're identifying constraints, setting targets for how we're going to scale up promising technologies and practices, and what are the right combinations of technologies and practices to get out the door.

These plans are taking into account the important role of women, thinking about sustainable commercial pathways with the private sector where possible, thinking about how to help the systems adapt to climate change, taking into account our objectives around nutrition, system resilience, looking at the policy environment. So as you might imagine, these scaling plans have to take a fairly comprehensive view of the country and the situation in the country, thinking about how we can best scale those promising technologies.

Another interesting development is that the end of June we announced, along with the Alliance for a Green Revolution in Africa, a new partnership, the Scaling Seeds and Technologies partnership, a \$47 million, three-year partnership which is intended to accelerate small holder farmer access to transformative agriculture technologies. It's going to be working in four countries within the G8's new alliance for food security;

Ethiopia, Ghana, Mozambique, and Tanzania. And it will be helping governments to strengthen their seed sectors and promoting the commercialization, the distribution, and the adoption of promising seeds and other key technologies.

They have set some ambitious targets for this program, increased the production of high-quality seeds by 45-percent in three years, and they are ensuring that 40-percent more farmers gain access to innovative agriculture technologies. So where we see this as a great opportunity to leverage technology as transformative potential and we're looking forward to really taking innovation to scale in line with the CATA process that's underway in Africa.

And then, of course, we're looking at event like today and others like this as a way of stimulating discussion and getting feedback from you all, the workers in the community, as to how we can best achieve this agenda.

So it's my distinct pleasure to introduce our speakers today. I'm going to introduce them briefly at the front and then they will go ahead and do their presentations. The first speaker will be Dr. Jerry Glover from the Bureau for Food Security here at USAID. He has a great title; he is the Senior Sustainable Agricultural Systems Advisor. He's also a National Geographic Explorer. He has a PhD in soil science, he's an expert in perennial and integrated agricultural systems, and his work has been highlighted by *Scientific American* as one of the top ten world-changing ideas. So we're truly fortunate to have him on our staff.

He will be speaking today about systems research and developing linkages for scaling this research in a heterogeneous environment.

Our next speaker will be Bob Nanes of IDE. He is the Vice President for Technology and Innovation working in agriculture and irrigation development for over 30 years. He has run two private businesses, and at IDE he has run more than 50 projects as a country director. And he has been contributing to IDE's core agricultural methodology. He will be talking to us today about the relationship between research and dissemination, particularly in the private sector for supply and service.

Our last speaker, and this is how we can take advantage of fantastic technology – our last speaker will actually be joining us from Nairobi. He is Steve New of FinTrac. He has a PhD in post-harvest physiology and three decades of agricultural development experience across four continents. He's managed USAID projects, he's led donor evaluation teams, and he's advised government ministries and producer associations in agriculture. He will be speaking with us today about addressing

constraints to scaling and commercialization, including the key issue of financing.

So I look forward to the talks, and we'll be – as Julie said, we'll have time for questions at the very end. Thank you.

Jerry Glover:

Thanks so much. Good morning, everyone. I'm very pleased to be here this morning, talking about some of our central programs at USAID in terms of the Feed the Future initiative's research strategy. So I'll be talking about one of our central concepts that informs our efforts: sustainable intensification. It's a concept that's gained a lot of prominence in recent years. It's kind of the coming together of the environmental folks from the '80s and the green revolution folks on the agricultural side. So it's really now a consensus about the need for increased agricultural productivity, but with a tremendous emphasis on decreasing the negative impacts on the environment and with much greater emphasis on the social and economic conditions of the farmer.

Just kind of briefly on the concept, this comes from a recent panel report on sustainable intensification and some of the general concepts, but mainly we can look at ecological, genetic, and socioeconomic intensification. In other words, getting more from the sunlight, getting more from water resources, using improved seed, improved cultivars, better fertilizer management, better tillage management and so on. That way we can get more yield per unit land area. But of course we have to consider this environmental sustainability as well, decreasing greenhouse gas emissions, maintaining long-term soil health, and so on. So it's a big challenge as we try to meet these dueling needs of increased food production and a better environment. So that forms really a central concept around which we're developing our research programs.

Two of our major sustainable intensification programs are CSISA, the Cereal Systems Initiative of South Asia; and Africa RISING, the RISING stands for Research In Sustainable Intensification for the Next Generation, and it's focused in Africa. The CSISA program has done a tremendous job on scaling out some of these conservation technologies, getting better seeds and management practices for those rice/wheat systems in South Asia. Now of course Asia has gone a long way towards intensification as a result of the green revolution, with some environmental problems, with some social problems, and so now really CSISA combining some of the better agronomic practices with considerations of those social and environmental issues.

So, you know, they are a step ahead of us in some respects. In Africa, where increased total productivity has been driven a lot by extensification, in other words opening up more land area, rather than as in Asia,

increasing the yield per unit land area. So in Africa we face several challenging conditions that are in general different than those that we face in South Asia. And I'm going to be focusing primarily on our Africa sustainable intensification program because I think it will all set a context for the later discussion about scaling technologies.

So when we think about scaling technologies we're often thinking about specific – a specific crop cultivar, maybe increasing access to fertilizer, maybe just scaling up the use of a specific tillage implement. But what we see in Africa is we have these very patchy conditions. So here we have different fields, different distances away from a household with very distinct soil fertility gradients. The further away you get, often we get these very poor soils where nutrients have essentially been mined for long periods of time, and maybe richer soil is closer to the household, where more nutrients have been recycled onto those.

Now this isn't just on a single farm necessarily, but this could represent the soil fertility gradients we see with different economic levels of farmers. So maybe a wealthier farmer has been able to invest more in her land and she has a bit more soil fertility. With our research efforts we're primarily focused on these poorer small holder farmers operating on these more marginal degraded soils. And in fact, most of the farmers with whom we're working in Africa RISING are really down here on these highly degraded. So they're inherently poor, but then through many years of farming they've been degraded further. So we have this issue of simultaneously needing to rehabilitate the soils while also increasing yields, which present some issues with scaling whenever, you know, in other words an appropriate intervention on this site might be very different than the appropriate intervention on this site.

So we have to really target the interventions and understand what the farmer's needs are and what their agro-ecological requirements are. So that's the patchiness issue. And that's led to what some people have described as non-responsive soils. I was just up in Northern Ghana in the upper east region last week and we ran into this in several communities, where people are saying, "Our soils are so degraded. We apply expensive fertilizers. Our crops don't respond." There could be several reasons for that. One, they're maybe not using improved cultivars. But two, maybe the soils are just so low in organic matter that the use and efficient use, effective use of those fertilizers is very limited; soils don't hold water and so on. Anyway, farmers are very reluctant, of course, to invest in expensive fertilizers if their crops simply aren't responding.

So that gives us an indication that it can't be a single intervention, that we have to think about multiple components here when we think about increasing the yield per unit land area. And that's not just, you know, it's

difficult to invest labor, fertilizer, seeds in these soils unless you take care of those multiple issues.

This is just a graph from those folks on that – from this report, where they show what they're talking about. Oftentimes on research stations where these new cultivars are tested or fertilizers are tested, you get nice response results. Add the fertilizer, your yields go up. But this is what we see oftentimes in these small holder farming systems on the poor soils.

The other issue is farm diversity. This is just a diagram of nutrient cycles within the farm. So we have different quality of lands. These are the poor fields, lighter in color. We have different crops, we have, you know, higher productivity soils. Nearly all the farmers we work with have livestock, a very important part of their system. So that has to be taken into consideration. Tree crops are an important component as well. So when we're looking at increasing the total productivity of the farm itself, we do try to look at multiple components. And of course that brings into the issue, well then which technology are we trying to scale? If we scale a technology that improves the yield of maize, for example, in Malawi, that might not substantially improve the economic conditions of the farmer. We need to look at the whole system itself, which then we get the question, "Well how do you scale such a complex issue?" thinking about the patchiness, thinking about the poor soils and so on.

So I just want to give one brief example from Malawi. I can't say that it's a success yet because this is just the second year of Africa RISING, but I'll show – I'll lay out the system and then the plan that we have for scaling a system focused around a specific technology.

So the system, and this is just one system that we're looking at in Malawi under Africa RISING, but it's the doubled-up legume system. It was developed by University of Malawi researchers and folks at Michigan State University, and it's been extensively trialed, tested, and adapted in parts of Northern Malawi. We're now working in regions around Lilongwe near the Zambia border with this, but essentially the first year – this is what's called the doubled-up legume part. Growing – intercropping pigeon peas with soybeans or ground nuts in the same year. This is an interesting system because these soy and ground nuts are very fast-growing, they're short duration crops and you get some yields right away. Complementing that is the pigeon pea; it's a much slower-growing crop, it's longer-lived, and so while the soya is growing very quickly, the pigeon peas kind of growing slow, not competing with resources, but still fixing nitrogen. It is a legume and it fixes a large amount of nitrogen.

In the second year – so the first year you get a harvest of soy or ground nut and a harvest of pigeon pea – the second year the maize is planted into the

regrowing pigeon pea – it's a short-lived perennial – and you get a maize yield and a pigeon pea harvest. And it's been widely tested and shown to be very nice in terms of providing multiple benefits to the farmer. They've gotten equal yields of maize with half the fertilizer rate and roughly twice the amount of overall protein in the system. So you get, in two years you get three harvests of legumes, one harvest of maize, and you can carry that out to a third year of just mono-cropped maize to take full advantage of the extra nitrogen provided by the pigeon pea.

So again, this system is really addressing multiple issues: restoration of soil health, improved nutrition, increased or high yields of maize with lower inputs. So you get that full complex of sustainable intensification in a fairly simple system. You can also address some of the livestock issues, because it produces excellent fodder for livestock as well as the grains. It's been tested in terms of impacts on household nutrition. So it's a pretty good example of what we're talking about when we're talking about a system of sustainable intensification.

So how do you scale this? Well, you know, the key component here really is pigeon peas. We have access to some good cultivars of soybean, good cultivars of ground nut. There are still issues in the seed systems with that in those areas. But we can still get access. Maize, we can get good access to some maize hybrids and so on. Pigeon pea is a real issue here, though. New cultivars have been released by Icrisat, not widely available. So what are we going to do if we want this system to be successful? You have to have access not only to the seeds, but the information on how to grow it in this system and information on how to process it so that it's actually usable, marketable, and has positive impacts on nutrition.

Here's the system in a picture that I think shows you a little bit better. In the under story, here's the ground nut ready for harvest, and you'll see the pigeon pea is just now flowering. So there's really not much competition for resources at that point. Then, of course, after the harvest of the pigeon peas they'll go in and plant maize for the next season and the pea pigeon regrows. And so this just shows you that system a bit better.

The roots actually, you know, are able to penetrate a bit deeper, so it's growing in the dry season on residual soil moisture. That's an important point, because keeping continuous living cover on the soil is an important aspect of this. And in this system we have living plant cover throughout the full two-year period. So that's a cornerstone of that conservation agriculture concept that's one of our sort of entry points for sustainable intensification.

So in terms of how Africa RISING is working to scale up this system, and again, it's just one system of several we're looking at, we don't want to

divert a lot of our research moneys towards development activities that are covered by the mission or other development projects. So we've tried to focus our resources primarily on the agricultural research and the seed issues and so on, but linking closely with USAID Malawi's flagship Feed the Future initiative project, the integrating nutrition in the value chain.

And so you can see the interesting complementarity of this agricultural system with a nutrition-focused program, increasing the legumes, but they're interested in the increased value of the legumes, whereas agronomically we're more interested in the ability to increase yields. Now there's very strong linkages between that USAID Malawi project and the public sector. These extension program areas, there are quite a few across the country. It's a way for the government to get information on agricultural practices, processing, nutrition directly into the farm households. So that's a direct connection to the farms across much of Malawi.

We can work through health clinics in this program. I put school lunch programs; I don't know that USAID Malawi is doing this, but just across the border, in Zambia, to promote biofortified maize. They're working directly with school lunch programs to get it directly into schools. The children then take that understanding home, and that's a great scaling up.

The private sector, in a research program we're often encouraged to connect with the private sector. That's a lot easier said than done; that's one of our big challenges. Because at the research stage the private sector isn't necessarily very interested; they'll come to our meetings and think, "Great, but, you know, we're trying to get something right now out." So I think we've found that staying in contact with them through these major development programs that give them a lot more opportunity for their commercial interests, that's better than trying to really force that relationship into the research itself. And through this we can then reach thousands or tens of thousands of farmers with this one system through the education materials and the public sector investments.

Anyway, that's kind of a very brief overview. I hope it kind of sets the context for the subsequent talks. But I think it's important to keep in mind in these challenging conditions, it's very difficult for farmers to invest in an expensive input when the results are often very unpredictable. Anyway, thank you very much.

[Applause]

Jerry Glover:

Sorry, I put one more additional slide on. If I can get 30 more seconds. I just – I did want to offer this up as an additional opportunity for scaling this based on recent projects that PV and others here have worked on,

really trying to align different funding streams. So there are often national government policies committed towards a green economy; we see this in several countries, reducing emissions or perhaps, you know, sustainable landscapes in terms of decreasing deforestation. And of course, USAID puts money to different components as well. So Africa RISING is part of our food security investments, but we also have investments in sustainable landscapes focused on global climate change mitigation, and we have biodiversity funding. Often those go to different landscapes in the past. So we've piloted with no results yet, but we're hoping in Malawi and Zambia we can align these to – and focused on this doubled-up legume system and agroforestry practices that looked very promising in terms of decreasing greenhouse gas emissions and possibly providing fuel wood that decreases deforestation rates.

There's another opportunity to work with the government on a much wider scale, get more investment in this, perhaps convert some of their fertilizer subsidy programs over to these more biologically-based approaches. Anyway, that's just sort of an add-on. Okay, thanks. That's it.

Bob Nanes:

Well, welcome, everybody. It's nice to see not everybody's on summer vacation yet. So I'm going to talk today a little – oh. So I come from an organization – for those of you who don't know anything about IDE, we are an international NGO that has focused on small holder agriculture income generation, especially through off-season crop production. We focused a lot on small-scale irrigation and also drinking water and sanitation. Especially recently we've gotten quite involved in marketing of latrines in a sanitation marketing program. So we are a dissemination organization. And although we're not a research organization, we have been involved in some research projects. So I'm going to talk a little bit about the relationship between research and dissemination.

I'm going to talk about a specific project that we were involved in, which was called the AgWater Management Project, funded by the Gates Foundation. And I'm going to talk about what are the outputs of that project and then what we're doing with those outputs. And then I'm going to talk a little bit about what I see as some principles governing dissemination and how that's related to research. And maybe a little provocative at the end, if I still have time, talk about what is scale, what is this scale thing that everybody's talking about.

Okay, so the first thing, and this is not rocket science, but I think the key word in this sentence is the word "quality". So of course every researcher is going out and interviewing farmers or whatever. But IDE has recently, or in the last few years, gotten involved in something called human-centered design, and in that you have to have a very substantive

interaction with the farmers from the very beginning. And substantive is not just going out and doing an interview; it's spending a week in a community and understanding what are the triggers that drive purchasing decisions and what are the – and getting beyond what we call “the scripts”. So you go to a farmer and you interview them and you always get the same answer, “Yes, I want that” or “Yes. Yes, yes, yes, yes,” everything is yes. But there are things going on behind that and there are ways to get beyond that. So those substantive interactions with farmers from the very beginning in the design of the research and also in the implementation and dissemination.

And not always thinking that you have to come up with new technologies. When I look at this – when actually this other research project, it was really more surveying what's out there and what works rather than trying to come up with something new. And of course a lot of researchers want to come up with something new because then they publish and they become the designer of something new. But it's a lot easier to find something that works over here and maybe try it over there.

And again, in this human-centered design process there should be a lot of back and forth. So for instance, in some of the things that Jerry has talked about, you know, trying it on a small scale, actually doing test marketing to see if someone's willing to buy what we have to offer, and then going back to the drawing board and saying, “Okay, what did we learn from that?” So prototyping, test marketing. And also linking up disseminators with researchers from the very beginning. And you'll see in the example that I give that that was the case. So that's not just researchers working alone and then handing off, but disseminators having an input from the beginning.

So this was the AgWater Solutions Project. It was funded by the Bill and Melinda Gates Foundation. And these are the partners, so you'll see these first three – I guess I have – these first three are all research institutions, IWMI, IFPRI, and the Stockholm Environment Institute, and FAO and IDE are you can say more or less dissemination organizations, and the CH2MHill is kind of a project management organization. So it was looking at water issues, primarily in Africa, although in Asia also, but with this kind of multi-disciplinary look at things.

So what came out of that project? They surveyed a lot, they spent a lot of time in the field in West Africa, in East Africa, in South Asia, and they came out with three technologies that they felt showed the most promise in the area of water, and especially small holder irrigation. So one of them those is the small motorized pump, which in South Asia is ubiquitous at this point, but in Africa it is really just coming on and also the prices are coming down. Rainwater harvesting, that has many different

ramifications; there's different ways to harvest rainwater. And then tapping groundwater. And you can see here is one very inexpensive way that was transferred South Asia into Africa to actually drill – hand-drilling of tube wells, which is about 1/20th of the cost of getting a rig out there and doing the same thing.

So these things were, after extensive research, were seen to be promising technologies. And so what – so I'm going to give you examples now and then I'll talk about how we would take this research and put this into use, or how we are doing that.

Okay, so motorized pumping. Right now in West Africa, where I was just living for four years, I was also living in Ghana, so I can – Jerry just came back from there – you can get a pump, something like that, for about \$150.00. Okay? That is potentially revolutionary for a lot of small farmers. Of course, we have to be very aware of the environmental implications of that, and IWMI did a lot of studies related to how much actual water there is available, so we don't go out and pump all the water out of the aquifer, and so there's no drinking water left. But there is a lot of potential in Africa for this.

So how would we go about disseminating this technology? First of all, it's already being disseminated, but how do we make it go faster and how do we help it reach poorer farmers, okay? So the first step, of course, is to learn about what this thing is, to understand what makes a pump a good one and what makes a pump a bad one. And so that's the technical knowledge of the relationship between the pump and the engine. I won't go into all the technical details, but it's learning about that. And then it's setting a set of criteria in which we can actually field people, either the government's field people or our field people or some other NGO or agency that we're working with, so that they can make recommendations about this is good and this is not good and this is what to look for and this is what not to look for. Okay?

And then, and this is where IDE's – and the other thing I didn't mention is, I mean back to the early '80s IDE has been involved in setting up private sector supply chains to deliver goods to farmers in helping to facilitate those private sector supply chains. So this is where we start to create partnerships with private sector supply actors. In this case it would be helping to facilitate a chain of importers, wholesalers, and retailers so at the same time the next step – well, okay, so all of this has to be done at the same time, okay? So you're creating demand, you're creating a supply chain to fulfill that demand, and you're also creating a service sector that can service the technologies, okay? And this is particular for this type of thing, but I mean the same kind of principles I think even can be applied to seeds or fertilizer or any other type of intervention.

So it's about looking at a market system where you're stimulating demand and where at the same time you're building up a private sector profitable supply chain. Okay?

Now manual well drilling is a little bit different. I put this picture in here; I don't know if you can see it very well, because this is the alternative to manual well drilling. There's a guy down in that hole there, digging a well. This is in Northern Ghana actually. But there are ways to very easily, from the surface, hand-drill in India or Bangladesh; it costs like \$10.00 to drill a 30-foot-deep well. But of course it's more expensive in Africa. But it's a technology that should be disseminated. It's not applicable in every place.

So the first thing you have to do is understand, and Jerry rightly brought up that there's a lot of inconsistency in the things that he was talking about, there's a lot of inconsistency in what's going on under the ground also. So you have to understand what types of areas it's appropriate to work in, and then you have to look for those people in the area who are capable and desirous of being well-drillers, okay? And it's usually – I mean it can be people who are already involved in well-digging, of which there are some; it can be people who are laborers; it can be community people who are just interested in finding a new way to make a living. And so you have to train local well-drillers. One interesting way to scale it is you have a team of three that are drilling a well; there's an older guy and two younger guys, and eventually those younger guys are going to go off and train two other younger guys, and that's the way – that's the way it happened in South Asia. I mean nobody actually did it there, but over a period of 50, 60, 70 years. Okay, I'm moving.

And then you have to create a business service model. In other words, how are these well-drillers going to have to make a living? You have to help them to develop a business model that is profitable for them. How are they going to charge for their services? Who's going to pay for this? Who's going to pay for that? Are they going to get money upfront? Are they going to give somebody credit? All of these things. Okay? And then, of course, you have to help with promotion, okay? You have to stimulate a demand. That means demonstrations, farmer meetings, group meetings, etc.

Okay, some quick principles. This is something that researchers quite often don't pay attention to, the investment costs that – I mean we can come up with the greatest technology in the world, but if farmers can't afford it then it goes nowhere, okay? So getting cost down or if we get it down as low as we can and then we have to look at financing options, and that's also very difficult. Rural-based financing is a field that IDE is

involved in right now, but it's a new field. There's not – I mean it's not new, but this hasn't been very successful in the past, so working with that is very critical.

Private supply chains. Don't bypass private sector supply chains. It's so much easier to just go buy a bunch of stuff and get it out the farmers. That's the kiss of death for scale, because it's just not – it's just going to flop after you stop pouring money in. And then last mile distribution is critical. So farmers – you need to bring things to the places where farmers shop. Every farmer shops. Every farmer goes to the local market or to the local town, even the poorest of farmers, okay? And that's where you've got to get the things that you want them to buy, okay? So that's where that retailer or developing retailers out to that last mile is important.

And these – we shouldn't be afraid to put public funding into all of these – all of these pieces have to be publicly funded. Technologies that are good for small holder farmers are quite often not profitable enough to support the R&D and the promotion and the monitoring and evaluation. And so that's the role of I think the people in this room.

Two minutes. So this is my question. You know, everybody's talking about scale, and scale is great, and IDE has been focused on scale from the very beginning. But what is the balance between scale and depth of intervention? Okay? So this is just a little, just maybe a topic for discussion. I mean how much do we – by saying we have to reach a million of something, do we sacrifice reaching 200,000 at a much greater intensity? And what are the – how do we make decisions about that? And I think, you know, and the other thing about scale is I can reach a million of something, but a million of something only means something based on the impact that I bring to it, right? And even that impact is only relevant if it's reaching the right people and if it's sustainable. Okay? So it's very easy to pump numbers up, but I think we have to be careful about what those numbers really mean. Thank you very much.

[Applause]

Steve New:

Hello, everybody, from Nairobi. I hope you can all hear me. Okay, this is Steve New, and it's a pleasure to be here, to be online with everybody. I work with a company called FinTrac. In case you – there may be a few people out there who haven't actually heard of us. We are a consultancy, agribusiness consultancy contractor. In the past we've mainly focused on high-value crops. Obviously if farmers have small areas of land, to make a decent living they need to focus on something that has a relatively high value. So some of the things that we have specialist knowledge in how to involve research over the years as we've worked on things like vanilla

passion fruit, flowers, some of these things that have a very high value per unit per square meter.

So I'm not sure how research-oriented. This is just a – I'm going to be at a ____, but I'll try and relate everything I say to specific research and technology adaptations. And this is just a slide of that interest methodology, it's a generic slide, and as you can see, new technologies are very much part of what we do, along with good agricultural practices and market opportunities. And I think I'm going to be mentioning market opportunities a lot over the next few minutes.

Okay, so one of the major constraints to farmers using technology – well, the first thing is why would they want technology in the first place? And the only reason anyone is going to make any investment, any farmer, like anyone else, into any kind of technology is if they've got access to markets. And most small holders, most small-scale growers in Africa and elsewhere still have fairly limited access to markets; they live in remote areas, they don't themselves do much consumer spending, so they have very little knowledge of markets. So that's something, before we even think about, you know, why the technology doesn't get to the farmer, why does the farmer got any reason to buy it.

Also what we find is that most companies – and we have to have companies involved here obviously to supply the technology, but also to buy the product for which the technology is needed, generally speaking don't have business models to allow them to buy from thousands of farmers economically. So again, we have to look at this bigger picture if we're looking at transferring research and technology.

Then, of course, the farmers need knowledge and application of cost-effective technologies. Something has to be affordable; I think everyone has said that so far. It's pretty obvious that if a group of farmers are going to buy a pump they want something that costs a few-hundred dollars, not something that costs thousands.

And then finally, underpinning all of this, unless there's finance and credit available to purchase whatever it might be, the pump or the machinery, there has to be finance and credit. You know, most small holders – most farmers in Africa and elsewhere live hand-to-mouth; they don't really have many – if they're going to spend their money they need to see a fairly short-term return on it. And this applies particularly I think to buying any kind of technology.

And here's the best way to get around this. Okay, so if we think that technology is a good thing, and I think it is then, then basically help – really most of the ways that we have tried to raise productivity which

involves technology and better inputs, more precision use of inputs, is by working on business models where growers can come together either to share resources or to market some extent collectively. And this can be done in many ways. But there's something that maybe the researchers don't always pay attention to, and that is that people sort to be – tend to be forgotten, there's a general view that somehow small holders inherently are less productive than large-scale growers. Actually the opposite is true up until the farm gate, up until the time that a product is sold by a small-scale grower, actually they've got every opportunity to be more productive and get higher yields.

The problem comes after that, with aggregation of the product. It's pretty obvious, but we don't always think about it. So aggregation, once you get past the farm gate the small holder becomes increasingly less competitive, but up to the farm gate there's actually no reason why small holders should not be fully competitive. The real problem for small holders is not that they can't get high yields and produce competitively, it's that they're constrained by the size of their land, which is why we normally, on income-generating projects at least, we're focusing on the higher-valued products, if we can, and usually those higher-value products require some research and some technology.

The other thing about – you know, so this is my second point really, the other thing about working in groups is that you reduce the cost of production in various ways, you have an opportunity to improve quality control. This is a big thing if we're dealing in cash crops these days, quality, uniformity in particular, but also getting the highest possible quality is a big deal, and I already mentioned aggregation. Also less risk. And when we talk about business models for small holders, they incorporate almost inevitably if they're commercial, various improved seed and good post-harvest equipment and so forth. Actually there's this perception that really it increases the risk, buying for the _____ growers increases risk. Actually I'll come to this data, but in Kenya, for example, where about probably more than 100,000 small-scale growers are supplying the top UK or European supermarkets, the reason that's so successful is because buying from small holders means that the risk to the exporters is actually less than if they were growing vegetables on large irrigated farms.

The other thing about working in groups is that – commercial groups, is that it means that technology can be shared. So it obviously shares the cost; it shares the cost of training. People who are good at doing something can show other people – all the obvious things. And then of course in the end the marketing is easier. Bulk buying of technology is obvious. But then perhaps _____ again and most important, it's much easier for banks and financiers to provide funds for anything, inputs or

technologies, if they're doing it through some kind of group scheme. So for all these reasons and many more, really I think the only way to commercialize farmers and therefore – and to actually introduce technologies that make farmers even more commercial is if they're working together.

And here's an example, really I put this example in because I was just talking to a company last week called Dry Land Seed in Kenya. They have an interesting business model and they're trying to sell – to grow and sell open pollinated maybe _____ sorghum seed. This is not the highest quality – the highest-value product. And generally, as you know, the large seed companies aren't that interested in marketing open-pollinated seed. But nevertheless, farmers need improved quality of – higher quality seed. And so what Dry Land Seed are trying to do is to – and are doing actually quite successfully at the moment is to contract a few-thousand or a few-hundred small holder growers to grow uncertified seed, mainly cow pea, pigeon pee, green gram, sorghum, and so on. These are somewhat higher value than maize, but not much.

And they've gone through a process of introducing the right technology to the farmers, they've brought new varieties to the farmers, which can yield better and can be more adaptable. And they've got technology for grading and storing, and they've got a strong market. But, you know, they came to markets and said, "We're okay. We want to do – we want to – we've got a market for three or four times more than we can contract. Why? Because we can't get financed to do it." And I think – I've just, you know, this is a typical story that whether you're selling technology or whether you're selling a product, generally speaking finance is still the issue.

And yeah, it's just – so it might be – so it's interesting to look at examples of research in – in this case research in technology without – so I sort of put up, just mentioned three examples that we've been involved in over the last few years of where technology and research – incentivizing formal and formal research and then technology has contributed to a big success.

The first one is to do with vanilla in Uganda. Uganda's about I think the second-biggest supplier of vanilla to the world market right now, and a few years ago, a decade ago was not a producer at all. And that has largely been possible because of a certain amount of research, and actually research and then technology that was zero-cost to the growers. The growers had to cooperate, but basically when you mature – when you grow vanilla you need to process it on the farm or very close to the farm, which requires a certain amount of basic technology. In this particular case what we did was we got coffee – Uganda is a coffee exporter. Coffee exporters knew nothing about vanilla. We were able to bring them sort of

the right kind of low-cost technology they needed to put processing plants in rural areas, which could then be accessed by thousands of farmers.

So, you know, it didn't require much research. The reason it worked was because of the high value of vanilla at that time, which gave everybody a great return, they were investing money upfront, the farmers got their credit.

The fresh vegetables in Kenya is massive, it's sophisticated, but it's fed almost completely by small holders. A lot of research and technology goes into this production. Mostly, though, it's to do with agrichemicals and irrigation. But again, the reason that this has been so successful and say hundreds of thousands of farmers are benefiting and using technology, they adapt technology all the time; new seed varieties, more safer chemicals. So, you know, what's happened over the past few years is because of demand for the market that farmers have had to adapt almost on a monthly basis to using insecticides and fungicides, which are less-persistent and we should perceive to be safer for the environment.

But these are all the time farmers – these are small-scale farmers, are innovating and using the fruits of research. Because it's commercially viable for everybody, you know, the companies that sell the inputs, the small holders themselves, the exporters. Everybody's making money, so everybody's happy to adopt the technology.

And finally a very recent one that we're doing right now in Zimbabwe, which where there's no cash flow whatsoever; nobody has any money in Zimbabwe, and good luck to them all tomorrow, I think it's there – or this week when it's their election. So we try to on a _____ we brought a plantation banana company onto an irrigation scheme where there's about 400 small-scale farmers who basically pooled their resources to have a shared irrigation scheme of micro-irrigation. And already now they're getting yields around 40 to 50 tons per – over 50 tons per hectare, actually, using tissue cultured bananas, which are a relatively new product of research in recent years. Everybody that – many small holders I think around the world are adopting tissue culture banana planting for lots of reasons. And they get money. Banana is a big market everywhere. Generally speaking, the margin for small holders is high on bananas. And so we're taking advantage of that in Zimbabwe, producing very high yields. There's a little picture here, you can see a tissue cultured banana in the ground next to a microjet sprayer.

So again, these are not, I don't think revolutionary technologies or particularly exciting research, but they work and they can be adapted in a very commercial environment. So anyway, my message is that we need

research and we need technology and small holders can definitely adopt it quickly, but there has to be money in it for everybody. Thanks.

[End of Audio]