SCALING UP INPUT TECHNOLOGY AND INPUT ACCESS: CLUES FROM ZAMBIA

AUDIO TRANSCRIPT

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Presenters

Daniel White, ACDI/VOCA

Richard Kohl, Center for Large Scale Social Change LLC

Contributors

Kristin O'Planick, USAID (Moderator)

Mark Huisegna, USAID (Moderator)

PRESENTATION TRANSCRIPT

Moderator: Welcome to this month's seminar on scaling up input technology and input access, clues from Zambia. Welcome to those of us in the room. Now please take a moment to silence your phones. And welcome to those of us joining over the webinar from around the world. Last I knew, the price for furthest away was Nepal, so kudos to you for staying up late. So I'm Kristin O'Planick from USAID's bureau for economic growth, education, and environment. And this is a special joint event. It is an Ag Sector Council and a Micro Links seminar. So we are doubly glad to have you with us.

Today, we will explore two new studies on Zambia that review different aspects of the agricultural input supply market evolution. While we all are well aware of donor obsession with scale, within the context of markets, it really is about reaching a point of sustainable viability, not necessarily number volume. So why does this matter? Over the course of the discussion, we aim to discover just what factors did allow for inputs to scale in Zambia and what that might mean for other markets that we work in. These cases were commissioned from different perspectives, and we got lucky that they compliment so nicely. In a moment, Mark will give us a bit of context on the drought tolerant maize study, but this scaling impact Zambia PROFIT case study is the first study reviewing the expo status of business models initially supported by donors' market facilitation projects.

The second is currently in progress in Cambodia. Those of you familiar with the MSME project. This study examines to the extent – examines the extent to which input suppliers continue to serve the smallholder farmer market, and I'll turn it over to Mark to continue your introduction.

Moderator: Well good morning. Thank you for coming, and hello to all you people online. We have a special – couple special guests here today. I want to introduce – one is Dr. Richard Kohl who is leading our series of case studies that we're just undertaking now in looking at examples of successful scaling. Dr. Kohl has been very supportive, helpful to USAID as we have really started to focus on how do we get some of the technologies that we have invested a lot of our research dollars in to scale, what kind of systems can we put in place, what could be some of the strategies. So he has been helping us a great deal work through some of

these issues, this – and then we've also got Mr. Dan White who is working as the technical director for ACDI/VOCA.

He's working on LEO-related activities and has also looked at issues of scaling some technologies including in Zambia. I think this is a great opportunity for Microlinks and the Ag Sector Council to start doing more together. I think we have a lot of shared relevant research, and it's – hopefully we can maximize our learning by joining together in some of our sessions. I want to just frame the study – so we're interested in monetizing our research.

Probably in Feed the Future, we've put close to a billion dollars of research and development money into developing new technologies in innovations. How do we get those technologies out to smallholder farmers? That's part of what we're trying to understand with through the case studies that we're now doing. I wanted to just put this up here because I think it just gives an idea of some of the challenges we have in trying to get technologies to scale. So if you look at this, this is probably a matrix a lot of you have seen before. It's very commonly used with infrastructure type of projects where you've got your public goods, your private goods.

You've got supply pushing, here is demand, pull. The thing is a lot of the research we've invested in is in crops, say like millet and sorghum that are down here, and there's not really a private commercial option for getting those out to smallholders through public funds. It will take public funding. We did some analysis on sorghum in Ethiopia, for instance, and found that getting the early generation seeds for sorghum had a minus 1,200 percent internal rate of return. There's not any private companies that are going to be interested in financing that type of scaling of a small grain crop. On the other hand, something like hybrid maize should be totally commercially viable.

And so some of the – what we want to understand through our case studies in particular is how this works or how we can have public private partnerships that can shift some of the other crops that we're looking at more from what we'd call a common good. So some of the open pollinated varieties of crops that we see over to more of the private good quadrant. I don't want to dwell on this, I just want to put this up there because it does sort of frame the way we're picking some of the cases that we're looking at. So with that, I'm going to leave it. I'm going to turn it over to Richard Kohl. If anyone wants to revisit this later during Q&A, we can do that. But Richard, the floor is now yours.

Richard Kohl: Thanks. Well it's great to be here, and I just want to expand a little bit on what Mark said about the studies that we're doing. We're going to be doing five country case studies, of which actually the Zambian maize case is the first. And what we're trying to understand, as Mark said, is what were the drivers and spaces that allowed for scaling up to occur successfully. And we are focusing specifically on cases where the commercial sector played an important role in scaling because as Mark said, USAID and Feed the Future put quite a bit of money into innovations, and we all know that there are limits about the amount of money that don't – the old school model of well, we put out an RFP or RFA for $50 million for five years and you do 100,000 farmers.

How do we scale that up? Supposedly we do another five years and another $50 million and another 100,000 farmers. We're just are never going to get to scale that way, even in the zones of influence. And so the question we were really trying to ask is is there a way whether USAID or other donors for that matter can create a foundation, a critical mass, a tipping point, all of the above that allows the types of innovations that USAID has been funding and supporting to go to scale. And so we were looking for cases where that had more or less happened to some degree or another, and what could we learn from them.

Maize, hybrid maize in Zambia was one of them. Maize, hybrid maize in Zambia was one of them. I want to say that we try to focus basically on three or four factors. First of all, was there some characteristic of the innovation itself that allowed for scaling to happen? Secondly, was there some characteristic of the market system or the enabling environment? I use both those words because I don't want you to think it's only the private sector structure or only the political regulatory legal, but both including potentially government policy. And last but not least, was there some agent or driver or leader that actually proactively pushed a scaling strategy, and if they did, what were the activities they did that were successful and what can we learn from them?

So I'm not going to read these slides. I get the impression that most people here are literate. At least that's my presumption. If you're not one of those, my apologies, but let me just give a little bit of background because actually this is important. Maize, historically, and particularly in the last 20 years is only grown by small farmers in Zambia. And that has a lot to do with actually some distortions that the government has introduced in the market that makes it

unprofitable for larger farmers to do so. And we could talk about some of that a bit later.

One of the points I want to highlight is that history is actually really important in this case, and we've already done a couple other cases where that's showing the case. There are two things that are very important. I have to say – confess that my PhD is in economic history, so perhaps that's my bias. But first of all, in the case is that basically, a lot of African countries had state dominated, state funded, state implemented, quasi-socialist or statist, I don't care what label you want to call it.

But heavy government intervention up through the early '90s. and a lot of whatever happened in agriculture for good or bad up until that point had – was state driven. In the case of Zambia, that's actually quite relevant because hybrid maize did go to scale in Zambia in the 1980s almost exclusively driven by government working in partnership with some of the donors, brought in people from Yugoslavia or the ex-Yugoslavia who created a breeding program, and then they pushed through the government extension system.

And a very large number of farmers, I think it was 60, 70, 80 percent were using hybrid maize. Zambia, as some of you probably remember, was a highly indebted country, and in the 1990s had the usual structural adjustment plan with the World Bank and the IMF. That entire state apparatus was completely dissembled. All the subsidies, all the intervention, a lot of the extension system, the state marketing board, the whole shebang, and as a consequence of that, the adoption of hybrid maize dropped precipitously. Probably to less than half of what it had been.

And that state of affairs continued through the 1990s. Now one of the other consequences of structural adjustment was the dramatic liberalization of access to foreign exchange or the ability of multinationals to come in to invest, free foreign exchange rates. They could take money out of the country, very liberal, hands off market environment. And the reasons that's particularly relevant in this case is because what happened along with some other historical reasons which I'll mention briefly is that Zambia became the center for maize seed production for Southern Africa. One factor was the climate was perfect and location was ideal. It's sort of centrally located in Southern Africa. Second, for better or worse, a lot of maize seed have traditionally been produced in Zimbabwe, and as things started to go downhill with Mugabe, particularly a lot of white farmers who had been traditionally the big maize producers and maize seed producers, fled.

So when you go to Zambia, a lot of the multipliers are ex-Zimbabwean farmers who now live in Zambia, and along with that, all the big guys moved in. DuPont, Monsanto, et cetera. They did not move into Zambia to produce maize seed for Zambia. And in fact, for many years, they didn't really sell much maize seed in Zambia. They were exporting to South Africa, Zimbabwe, and all the countries in the region I think as far up as even Kenya, Tanzania, East Africa. Well it's not that far. There's borders there.

So that's important to know. What I want you to particularly think about is that then what happened is both in the early and mid 2000s is Zambia has traditionally not been food secure in maize. It has traditionally been a large maize – that maize importer, and they were droughts and other food adverse weather conditions in the 2000s, particularly I think it was 2000, 2001. I'm sure somebody is going to correct me on the years in 2005/2006, which spurred the government to take action. Initially, the action was we want to become food secure and food independent, but there wasn't any there there. They weren't actively pushing it, though they did start to reintroduce two key programs, which Dan and I will be talking about quite a bit today, one called FISP and the other called FRA.

And FISP is basically an input supply program which allowed farmers to get access to a minimal amount, basically enough for a hector or half a hector depending on the intensity of usage of fertilizer and what ended up being hybrid maize seed and FRA was a buying program where the government started to buy especially in rural areas maize seed – maize output from farmers at guaranteed prices. After the 2005/'06 crisis, both of those programs escalated dramatically and steadily over the ensuing years. And so what happened was there sort of became a virtuous circle, in which is the government started pushing it. Farmers, many of whom were old enough to remember that they had been using hybrid maize 10, 15, 20 years ago, just wasn't really a new idea for them, started to adopt it.

And the seed company said, "Oh, there's a little bit of a domestic market, so let's start marketing domestically. The more they marketed domestically, the more farmers knew about this hybrid maize and were getting good results, and this was particularly supported also by CIMMYT, which was working with many of the large seed companies. Again, not targeting the Zambian market so much as helping them with germ plasm, technical assistance, and other things to improve

the quality of their maize seeds. And at this time in particular, USAID and the Gates Foundation and several others were also supporting drought tolerant maize for Africa, and this was an important part of the activities that CIMMYT was doing, particularly on the research side, both working with some of the large companies that develop their own brands and making available CIMMYT developed varieties of DTMA. Okay? So what you have then that happens - and I'm going to skip some of these because I only have 15 minutes – is you end up with a three-fold – actually, it's easier to see this graphically. So this is roughly about 2005 or '06. And right here, and about 2007 or '08, you can see that this really takes off.

And what you'll notice is several factors happening at the same time. You do get some bump in yields, but if you look at the scale, the bump in yields is not that big. It's kind of hard to make sense of this because the numbers bounce around, and if you think of that, that's actually quite significant. The reasons the numbers bounce around is that maize production in Zambia is entirely rain fed, so you can have the best – that's not true. We'll come back to that in a minute, but improved hybrid maize seed only moderates to some extent your ability to balance off when you have bad or good seasons. But if you kind of average this out, you get about a 20 or 30 percent bump in productivity, which isn't bad.

The big change you get is look what's happening in the amount of land being produced with maize. Okay? It goes from about 150,000 to 350,000 and is pretty stable, and when last seen was still headed north. Okay, the other interesting thing that's happening is more and more maize is being sold. And I don't have the table up here, but by the time we get around here, which is 2010/'11/'12, there's such a boom in maize production, particularly because of the increase in land being planted that actually, Zambia becomes a net maize exporter. The reason I'm kind of rolling my eyes about a net maize exporter is it's just a little bit more complicated than that, which is this whole thing is largely – well I don't know about driven – significantly influenced by the FRA buying program.

By the time we're over here in 2010/'11/'12/'13, FRA starts to buy 50, 60, 70, 80 percent of the maize being sold, particularly in rural areas. Okay? So if you think about it, you have guaranteed inputs at a heavily subsidized price, but not for large-scale production. Only for about a hector. If you want to produce more than a hector, you have to buy on your own, and a guaranteed market from the government that will buy. And the combination of those things is farmers started planting more and more maize. The government started buying more and more

maize, and all of a sudden, the question was what are we going to do with all this maize. We have more than we need.

And they started dumping it, actually, in South Africa, Zimbabwe, and others at substantial losses. So technically, I guess you could call them an exporter, but I just want to put a big asterisk there that this was not an exported profit, even though there is some evidence that Zambia does produce – could compete if they didn't screw up their pricing and distortions and all the other things. We can talk about that. How much time have I got? Five. Okay, that's good. So what did we learn about this about scaling? First of all, donors did play an important role in scaling up by particularly CIMMYT's work and working with the large companies, and also to a lesser extent, and I want to emphasize this because Mark mentioned it in his introduction.

A lot of the CIMMYT released varieties were OPVs, open pollinated varieties. The farmers don't want them. Did you hear me? The farmers do not want OPVs. They were often given away or introduced at NGO projects or donor funded projects, and the farmers highly prefer the hybrids despite the fact that they do have to buy them every year, though many farmers told me that in fact if they have a bad year and can't afford to buy one, if they just use them for a second year and don't experience that big a drop off at least the second year in productivity, but that was important.

Second, I think we have to remember that actually hybrid maize is a pretty good thing to adopt in the sense that it's not that complicated. They didn't have to change their practices. Again, this is different in Zambia and many other countries where they grow traditional staples like maize and rice, they don't use fertilizer and things like that. They were already doing that here because of the history. So the advantage of maize was basically plug and play. Take out the old seed, put in the new seed. You could do it at very low entry costs.

Unlike for example starting with a drip irrigation – well you can have small drip, but even so, the smallest drips I've seen are several hundred dollars, and usually if you're going to do a market gardens, talking 500, 700, 1,000, $2,000.00. You can buy 200 grams of hybrid maize seed if you want in Zambia. As I told you, that quantity is subsidized by the government. So the initial investment is very small. The technology is very simple. There's not a whole package of good agricultural practices that some team of agronomists have to come and sit and hold your hand for three years to get a bump in the productivity. You may have

noticed that the bump in productivity we only got was about 20, 30 percent. Probably if there had been somebody holding their hand, they might have gotten significantly more, and there is now a move in Zambia with some other USAID and other funded projects to introduce conservation agricultural because particularly Southern Zambia is particularly prone to climate change, and they're having more and more droughts and adverse weather.

Actually, that was very interesting. We wanted to see whether the adoption of maize was driven by adverse weather, and we had conflict because when we talked to the farmers, they said absolutely. Our rains are delayed a month or two, when they come, we have two, three, four inches of rain in like five days. Then we don't have any rain for three weeks. Then we have more rain, and then we don't have rain for the rest of the season. So our crops are wiped out by floods, we re-plant, and then we don't have enough rain to get that. So we are in fact by the way, we're seeing a substantial shift to short-term maturity varieties. However, the flipside of that was when we tried to verify that statistically.

We looked at annual rainfall measures and they hadn't changed. So what's interesting about this is it's not the amount of rainfall. It's the variability of when it comes, how often it comes, et cetera. I want to emphasize, which I mentioned before, the key factor that drove this was these existence of a large number of these multinational seed companies that were already producing hybrid maize. And for this, this is like a no-brainer. We don't have to do anything different. We've already got these varieties, and they now have aggressively selling – there's over I think about 10 or 15 companies now in the country, including several domestic companies have started to come in and are producing. I want to emphasize the dog that didn't bark.

As Mark can tell you, if you buy him a beer, he will cry into his beer or USAID's beer. One of the problems often in introducing new seed varieties is the existence of very strong state monopolies or parastatals that often control if not the breeder seed and foundation seed, the multiplication and often are a very strong vested interest that are very resistant to the private sector coming in. The fact is that in Zambia, Zamseed was privatized in the mid 1990s, and so therefore all the other seed companies were not competing with this big elephant that had state political support, et cetera. Okay?

Yes, I've got one more slide. Some of the other lessons I think with USAID in terms of thinking about scaling and other donors is one of the questions we went

in to ask was as I mentioned, USAID and other donors were supporting both germ plasm, better seeds in general, and particularly drought tolerant. And what made sense? What we ended up seeing is that today, drought tolerant maize still has a smaller share of the market. It's only about 10 or 15 percent, but it's starting to take off, and I think you can put the two and two together. The reason they're starting to take off is they're now – I should have mentioned that one of the things I think drove successful adoption if we go back to this slide here is, as you see the huge bump here, this sort of acceleration, and you see this huge bump here, these were really good years in terms of weather.

So they got very high yields those years. So just as FRA and FISP are starting to put it, these seed companies are jumping on the bandwagon and saying, "Hey, we can make a lot of money here," they get all this hybrid – not all, but a significant amount of hybrid maize seed out there, and the farmers have incredible years. They have huge surpluses, which they can make really good money and say, "Whoa." I can't tell you how many farmers when I say, "Why do you grow hybrid maize," and they all kind of look at me. "You'd be an idiot not to." Literally that was the response, and that response was based on this experience, even though subsequently look at what has happened to yield primarily because of bad weather.

So they're starting now that this is happening to shift towards drought tolerant varieties and short maturing varieties in response. And so back to my conclusions, it may make sense to try to get farmers to adopt some generic version of an innovation before we go with the fancy stuff. In this case, drought tolerant maize. Secondly, I think we'll talk about this more, but a bit controversial, one of the things we're seeing at least in Africa is even though it's not the flavor of the month for governments to intervene in the markets to subsidize either inputs or to buy at outputs, that clearly did play a role in the situation, an important role in the situation in Zambia, like it or not.

I think I'll be provocative here. One might like to think, whether it's USAID or the World Bank or others, is there a role in guaranteeing access both to inputs and some kind of market support on the output side for a few years so that to minimize the risk for farmers of adopting a new technology. Now we all know the dangers of that, and the dangers of that being once you create that constituency and politically, all the incentives for the government to not only do more of it, but to keep doing it, and in fact, that has happened here, and in fact now the maize subsidy budget, both on the input side and output side is eating something like 95 percent of the ministry of agriculture's budget, and there are

huge complaints from all the rest of the sectors that they get no support, and it's a big problem. I think Dan will talk about some of the things they're trying to do in that. The last thing I just want to say is that a key thing we've been looking at is why do all the actors play ball.

In this case, you can see there were incentives for the private sector. They could make money. There was a preexisting network of agri-dealers, which often doesn't exist, I should have mentioned that, and that was steadily expanded, though as Dan will mention, adoption appears to have largely started and been closer to major roads. As you get further and further away from the agri-dealers on the roads, the rates of adoption have been much lower. We estimate an average of about 60, 65, 70 percent, close to the roads is almost 100 percent. As you get 30, 50, 100 kilometers in, you're starting to see 60, 50, 40 percent.

And because this was largely private sector driven, even though FRA and FISP do make an effort to extend out there, we haven't seen – small farmers have adopted everywhere, but not so much small farmers in more remote, less accessible rural areas. So again, I think we can highlight that as an area where donor intervention can possibly help expand and extend the last mile. But my point being that we have the incentives align. The government was supportive, the donors were supportive, the private sector had an interest, and this made sense financially for the farmers.

When I say financially, the last thing I'm going to say is that there's a tendency when we scale up, particularly in agriculture, to look at crop budgets. When we run the numbers, price of the inputs, price of outputs, do they make money? We're finding that may be relevant, and it certainly is relevant because if it's a negative number, it never happens, but risk is more important than return. Let me say that again. Risk is more important than return. And in this case, the fact that FISP was minimizing risk on the input side by subsidizing the inputs, and zeroing out the risk on the output side, basically as I said, FRA is now depending up on the year, buying 50, 60, 70, 80, 90 percent of the output, and 100 percent of the output for farmers in more rural remote areas, has I think been a major driver.

Again, it's also created significant distortions in the market, not just on the government budget, but I don't have time to talk about that. It's created real problems in the processing sector. Its driven large farmers out of maize, but it has minimized risk and allowed for adoption. And so choose your poison. So I'll stop there, and we can talk about this more later. Thank you.

Daniel White: Thanks everyone for coming. Thanks Richard for an interesting first presentation. Hard to follow. So for those of you that don't know me, my name is Dan White. I'm a technical director for agriculture at ACDI/VOCA, and over the past two years, I've been co-leading the scaling research stream under the LEO Project where we've been trying to identify cases of programs around the world that seem like they have managed to sustainably increase smallholder adoption of improved inputs and practices at something approximating scale. At least scale as defined within the parameters of donor projects, which is a slightly different order of magnitude than what Richard has been looking at.

So today, I'm going to talk about one of these case studies, and specifically looking at the original Zambia PROFIT program, from a slightly different perspective than Richard has been talking about it. So I think it will be interesting to follow up in our conversations and trying to see where these might intersect. This is really going to be looking at what did that project do right, and what can we learn from it moving forward in terms of lessons to apply to other programs.

So for those of you that might not be familiar with the project, the profit program was implemented from 2005 to 2010, so you can keep that in mind relative to the time series scales that Richard had put up there. By NCBA CLUSA for the Zambian mission, and it was focused on a number of different value chains, but ended up doing some really interesting work on expanding input supply access for smallholders. So our case study was going back last year and trying to figure out five years later what of those systemic shifts within the input supply sector seem like they've actually endured and how they evolved over time after the project had left. So a quick note on methodology, there were several months of desk research looking at the past project reports. Some of the other evaluation material.

There's a wealth of existing case studies and other work on the Microlinks website, which I would highly recommend anyone going back and looking at, which were a very good starting point that really did – I think particularly compared to other projects at that same time. PROFIT was notable for how methodically put its theories of change were and how articulated from the very beginning of the project, both the design but also the measurement approach was going to be. So it was a really interesting case to go back to ten years later because you already have all of that articulated approach, where as with most programs you go back. If you can't talk to the staff that worked on it, a lot of that

initial thinking around the design gets lost and it's hard to interpret what they actually did.

So last May and June, we followed up that desk – this research with four to six week field assignment. I led it with Paul Kalu and Kelvin Luputa who were two of the Lusaka-based consultants that helped in particularly doing the heavy lifting, interviewing some of the end customer farmers. We interviewed seven input suppliers who had been partners with the PROFIT project in implementing this initial model. Sixteen of their former and current agents and about 50 of their current smallholder farmer customers in Southern Province. So before I get into the specific findings, there are two sort of higher-level takeaways I really want to emphasize for anyone that's looking for lessons to apply to their own project designer implementation.

First, I think there's a lot of discussion, and particularly in some of the existing literature and in people I've talked to about what was it about the PROFIT model that has really worked. This is something I talked about with Mike Field and the point he made that I think is really, really key, is that the – any of these models that we found that have been really successful, their success has been so context dependent that I think it's kind of the wrong question to say what are the successful models in terms of intervening in a value chain that are going to make systemic changes. It's really about what were the questions that project asked that led to the development of that model and response to that specific situation.

And the PROFIT project stood out, particularly at the time, because of how multidisciplinary and how synthetic their design in analysis was. So they were not just looking at the agronomics or the economics from a transaction perspective, but they were looking at how those overlaid with the social networks. So when we talk about moving from a value chain framework to a market systems framework, this is really what we're talking about. It's trying to figure out these complex histories and how they interact with the economy – with economics and agronomics at the same time.

So I think that's really what I would say as a universal best practice is making sure you're asking questions across all of these different layers. At the same time, this also echoes a lot of what Richard said, so I won't dwell too much on it. You really have to pay attention to these macro level trends. You know, it's very easy when you start implementing a project and you've got your deliverables and are going to hire staff and do these other things. You just drill right down into trying

to figure out what you're going to train farmers to do. If you don't take the time to figure out what's going on in the overarching economy, not just an initial snapshot at project design or at the value chain phase, but really take a look at what the enduring trends are going to be, looking at what's happening in relevant other sectors of the economy, looking at what's happening to other sub-sectors within agriculture, figuring out what's happening to things like the currency.

I mean this is a huge issue right now across most of Southern Africa where synthetic inputs that are primarily imported are suddenly overnight over the past 12 months or so no longer financially viable for smallholder farmers because the prices have gone up 80 or 90 percent. If you're not paying attention to these things, you can design something upfront that works very well, but you're almost certainly going to be overwhelmed by these larger effects that are operating on orders of magnitude far beyond anything any project would ever function.

So in my mind, we tend to design these projects like we're hiking where you go in and say, "Okay, you've got a static topography and you're moving from Point A to Point B, and as long as you keep up a steady pace, you'll get there. So you've got farmers that are growing 1.8 tons of maize per hector, and five years from now, they're going to be growing 2.8. But it's not really like that. It's more like we're surfing. If you're a good surfer, you might have your technique and know how much effort it's going to take, but you really need to look at the riptide and need to be able to read the swells and the currents and understand all of these much larger forces going on around you.

If you do that right, you're going to be able to go a lot further than if you're just going to be paddling to shore. But if you do it wrong, you're not going to go anywhere. So I think it's really important to keep track of those things. I'm not a surfer though, so I apologize. I mangled the sport for right now… So a little bit about the PROFIT project. So at the time, PROFIT was looking at a couple of different value chains, and Mike Field was one of the original architects of this entire approach. So the way he described their design was they'd been looking at a few different things and realized fairly quickly the input supply sector, and particularly this mismatch between the existing network of commercial agro-dealers and their smallholder customers – potential smallholder customers was a real problem point in terms of the fact that a lot of smallholders were not actually buying commercial improved inputs even though the economics were there to make it work, and there was some sort of distribution system.

So he went out, and their team looked at a wide range of things, and they found there was this particular negative feedback loop that was leading to that market failure. So on the one hand, you had input suppliers and the agro-dealer networks, which were based a lot on these personal relationships similar to the historical continuities Richard talked about. These are largely large scale commercial farmers that are mostly white with input suppliers who are also mostly white coming from the same social networks, and a lot of their sales were driven by these personal relationships.

So you had a very small number of customers who are all making very large volume purchases, which is what drove most of the input supply sector. So their entire marketing and sales strategy was very similar to their social strategy in a sense. At the same time, you had smallholders at the village level, and particularly in these further field areas that are generally very distrustful of outsider companies, so even if there was an input supplier that was thinking about breaking into the smallholder market, they couldn't make any in-roads because they didn't have any of those social connections that they needed.

So the profit project really focused on shifting input suppliers on trying to develop the model that did two things that would on the one hand shift input suppliers to what Mike Field called a mass-market perspective. So getting them to start thinking about what it would take to sell large – to sell to a large number of customers relatively small volumes that are all strangers and part of totally alien social frameworks to the suppliers, and at the same time, figure out a way to get input suppliers to leverage the social networks at the village level to build trust. So PROFIT deployed a couple of different models, but largely ended up settling on a few different variations with different partners on a hub and spoke agent model, which there's a lot of really great stuff on the Microlinks website, including a case study that Jennefer Sebstad did, another case study done under AMAP by Cardno and Joe Dougherty, which I'd recommend looking up.

I won't spend too much time talking about the specific dynamics of the model, but briefly, the way they'd work is the input supplier and village leadership would come together and they would talk about the various criteria for what one of these agents would look like. They'd select somebody from the community, that person would get trained up in marketing and a little bit of extension around whatever seed that company – this was mostly through seed, wanted to sell, and then that agent would work on promoting the seed to his or her neighbors, to bulking their orders, and to working out the logistics for the supply to the village once they got to a minimum threshold of tonnage. They'd make anywhere from

five to ten percent the value of the seed as a commission off of that. So they weren't holding stock, they were just making commission and coordinating the transportation.

So by 2010, this model seemed like it had really taken off systemically. That – in that paper, I referenced had gone out and tried to look at what the estimated impact had been, found that there were new firms crowding in that the project hadn't even worked with. There were four million unique sales through these agent networks, an estimated 180,000 farmers were getting reached through these expanded systems. CLUSA estimates through that throughout – their numbers are slightly higher even. They say it was closer to half a million by the end of the project that were actually getting reached through this, and so on a lot of different metrics, the growth trajectory was really on a path to reaching population level scale.

So we went out five years later and said, "Okay, did that really happen?" Well what's happened in the interim period and does it seem like this increased input supplier focus on smaller farmers was something that endured and was it still going on. And I encourage anyone to read the paper which is actually up on Microlinks now if you want to get a bit more into some of the data. If you're interested and have time, I'm just going to give the short spiel, which is that yes, they are. The smallholder farmers are still large and growing focus for the input supply sector. Most firms have expanded their rural catchment since 2005, moving into some of these areas that are further up the road, and they continue to do so.

Firms are providing are an increasing variety of inputs tailored to smallholder farmer needs, so they're proving scaled down product sizing and providing streamlined embedded extension information on those products that are targeted towards low literacy farmers, and they are now specifically marketing towards the different agri-ecological zones. They're marketing their short-cycle maize in areas with less rainfall, et cetera. Firms have also taken this model in different directions, so everyone that I talk to was still actively thinking about how to crack the nut of this smallholder market. Some of them are continually trying to push into greenfield market so they can be the first company that's really getting out in some of these more obscure areas, while others have decided it really makes a lot more sense for them to intensify their marketing efforts in their existing catchment and try to out compete their peers that way.

As Richard mentioned though, the PROFIT project in part got lucky because there were these other secular trends going on at the same time that had nothing to do with it that tended to increase both smallholder appetite for some of these improved inputs and also push the input supply sector to move out – to reach out to them. So there's the FRA and FISP, which I want talk any more about, but there was also this interesting thing that several input suppliers mentioned, which was that around the same time that you in 2005/2006 you had a crisis in a lot of the core commercial crops, including tobacco. So the commercial sector was starting to stagnate at that time and hasn't really recovered from that.

So their traditional sales market was starting to stagnate. At that same time, PROFIT came along, was saying, "Hey, we're really interested in trying to crack this smallholder farmers."

At the margin, I think that pushed them and they said it pushed them to probably take more risks than they might have had their existing market base been doing well. But even within – with all of these exogenous factors, a majority of the input suppliers that we talked to did say that PROFIT played a really key role in terms of stimulating their increased focus on smallholders, specifically because PROFIT insisted that it was these companies that managed the agent network, not PROFIT, and there were two companies I talked to who actually said the same thing, which is that in their initial negotiations with the PROFIT program, they were pushing very hard for PROFIT to be the ones who would go out and select the agents, who would manage the logistics of the supply chain because they didn't really want to deal with the headache.

But looking back on it now, they said that it was specifically that experience of having to go out, select staff in a way that they had never done before in conjunction with the village leadership to really try to actually go through the growing pains of understanding what had to change in their internal systems to make this work to figure out what in terms of increases in revenue would be necessary to justify the additional costs in terms of logistics. It was that experience that they said really has endured in terms of allowing them to understand what it takes to get into this market and making sure they were pushing through it. So I think that's definitely one of the key takeaways is even if upfront, it's going to be a lot easier for you to act in that facilitative role between the agent and input supplier, trying to move as far away from the village as possible, keep those activities within the existing supply chain. It's going to have a lot more growing pains upfront, but it can be a lot more durable.

So the last two things that I'll say are in terms of learning for future projects, so this multidisciplinary analysis upfront is key. This is what I was mentioning at the beginning and I think this is really where the success came from. As far as I can tell, I'm sure there might be others, but this is the earliest example of this agent model that I found within a donor context, donor funded program context. And I think that's mostly because they didn't go about it seeing if they could apply an existing model from somewhere else because at this point, these agent models are pretty standard.

Everyone says they've got their own approach to it, and I think they're quickly becoming the sort of new demo plot in terms of a go-to approach to agricultural development, but this was pretty early, and I think it's because they didn't start with a model and see if it would fit. They started with the analysis, they started trying to look at the interplay between economics and the social side, and then they backed out a logical model from that, and I think that's really – the last point that I'll make because I think it's something that came up in talking to some of the input suppliers who had stopped and abandoned the model is that it's really important when you're working, particularly at this last mile level where you're trying to get down to work with developing either a new agro-dealer or an agent who needs to develop a business model.

Any kind of level where you're going to be dealing with relatively small number of customers buying relatively small volumes of things, you need to be open to the fact that regardless of what your project works on, whether it's a maize and rice program or you're dealing with soy and tomatoes, you need to be open to working across anything and everything that agent could sell at the input supply level. In order for you to sustainably increase access to that maize seed you really want your farmers to buy, you're probably going to have to step back and look at some other higher margin products that that agent could push out at the village level that are going to give them full calendar year coverage. Right? Because when you're selling these staple food seeds, you're only going to be having a sales window of maybe eight weeks out of the year.

And honestly, that seed is never going to give them enough margins to make it worth their time to continue the program. So there was one of the input suppliers that was selling – that was using this model with just tomato seed in areas where the tomato production was all rain-fed. So again, you only have sales for about eight weeks out of the year, and most of these farmers that were growing the tomatoes were only growing those tomatoes in maybe 20 or 30 percent of their

land. There's a whole other host of things they were growing that they had to go somewhere else to buy their seed for.

But it meant that in a village of maybe 300 people, this agent, even if he was selling that tomato seed to all of them, was only making about $80.00 off of that. So this company had a problem where they came back to these agents, they said they had a decent first season, but they came back to them 12 months later and none of them wanted to do it again because they hadn't continued that relationship and it wasn't really worth their time for what they were able to offer. Now if those agents had been set up to offer poultry vaccinations, to sell solar lamps, to sell anything and everything that might have a slightly higher margin that would give them a full 12 months of sales, I think the likelihood that that could continue would have been much higher.

[End of Audio]

Discussion Transcript

Moderator: Okay, today because we have these two different case studies that are complimentary but not exactly the same, we've got a couple pre-planned questions before we turn it over to the audience in our usual fashion. So Richard, Dan, we talked a bit about the government subsidy, which clearly had a role here. Can the government buy its way to food security? How much do you think that the level of the government intervention mattered to the levels of adoption that you examined?

Richard Kohl: Sure. I think the short answer is yes. As I said, they went from deficits and crises in a few drought years in the mid- and early-2000s to being quote unquote net exporters of maize after 2010 or '11. That said, and this wasn't the purpose of my study so I didn't do the math, but one – I'd be willing to bet, and maybe there's somebody online from Michigan State who have done the math because they've done a lot of great – by the way, I should have mentioned that a lot of – even though I did a lot of field research, Michigan State has been putting out a huge number of extremely important studies for many years now that are absolutely invaluable and really have been a fantastic investment of resources.

That if they had been purchasing that on the open market, they probably could have done so I bet at half the price. They were for many years paying well above international maize prices, and as I mentioned, when they ended up with all this

extra maize, they had no storage capacity, so a lot of it is rotted. I don't know the numbers, but you hear people talk about 20, 30, 40 percent, and then they dump the rest on the international market. They were paying, I heard, something like over $300.00, $350.00 a ton at points.

They were selling it at $150.00 a ton. So that's not – from the economics. Now I understand and we can have a huge debate about it that it isn't just about the money, that these countries and governments for understandable political – I mean you can't get elected or stay in political power in Zambia without making sure there's enough maize for two reasons. Zambia is one of the most urbanized countries in Southern Africa. Only 60 percent of the population is in rural areas, and if you don't have maize for those people to eat, you're in big doo doo. And as I mentioned, for the urban – rural population, 99 percent of smallholders grow maize. So for them politically, it was a win/win to on the one hand provide subsidized inputs and buy the maize from smallholders and make sure they were growing it.

On the other hand, make sure there was cheap maize available for urban consumers. The economics were terrible, and they now have a huge problem, which maybe Dan can pick up in terms because they're trying some new things on the input side whether they can do that politically or not remains to be seen. So the question I think is more about yes, you can do it, but is it sustainable financially?

Also if my graphs were still up there, you notice the yields were going down. Well the fact that the yields have been really bad in the past two or three years, you may remember that I mention that the yield bumps were only 20, 30 percent. Well actually, the last couple years, the margins were sufficiently small, even with the subsidies, but the farmers have not made money, and a lot of the farmers I talk to in the most rural areas in the past – well not this season, but in 2014/2015 season actually lost money, which actually is pushing them towards maize and short-cycle maize, but they are not sure how much longer the ones that are in the more remote areas or more unfavorable ecological zones can continue to produce these even with the government support.

Daniel White: Yeah, I mean I think there's – that's the fundamental and political question that if you have the funding, you can coordinate – it's a capacity question, not a fiscal question, first of all. I mean I think that it's indisputable like what you said that there's a correlation, and that Zambia far outpaces, its neighbors in terms of

smallholder adoption of improved maize. And that is almost one-to-one correlated with the existence of the subsidy program. There's a lot of other distortions in the subsidy program as well, aside from the ones that Richard mentioned. There has been when it was based on a simple paper voucher scheme a really large secondary market that popped up across the country where we were provided basically a 50 percent coupon to take to your local agro-dealer, and for farmers who really needed the money would then sell those at 40 cents on the dollar to slightly wealthier farmers who would just collect a larger bundle.

So it ended up becoming a bit of a regressive subsidy through the secondary market. And there are some workarounds that are kind of interesting that they're using to get around that. They have piloted last season primarily in southern province and … Lusaka an e-voucher scheme that would provide a debit card that was tied to someone's national identification number that they could only redeem at certified agro-dealer shops, so it was also acting as a quality control mechanism for making sure that if you're going to be participating in this scheme, you have to get audited and certified that you're not selling counterfeit inputs that you're otherwise providing a baseline of quality to the farmer customers. And that pilot seems like it's gone very well. I haven't seen the data yet. It should be coming out fairly soon, and they're now this year actually looking to scale that up to over 600,000 farmers across an additional 13 districts in the country and trying to expand that now to become eventually a standard certification for any agri-dealer that wants to work nationwide.

Richard Kohl: If I could just come back in on one very important point, and I do not work for Michigan State and have never worked for Michigan State, but Michigan State did a very important study on the social impact of the input subsidy program. And one of the key things that the government of Zambia has done persistently is they explicitly did not see this as an anti-poverty program, particularly the input subsidy. They saw it as targeting emerging – what they call emerging farmers. And there isn't a strict definition of emerging farmer in terms of land size.

Land size is very complicated in Zambia because there's actually – it's one of the few countries where there's excess land and often farmers have more land than they actually cultivate, but the criteria and principle was farmers that had a commercial orientation. And so who – even though small holders are often defined as less than two hectors or less than five hectors, the fact of the matter is that FISP did not go to the bottom 40 percent of farmers in terms of size. And so the Michigan State study shows again, I think we're finding this pretty

consistently. That just like we've discovered with micro-finance, actually, micro-finance doesn't help the poorest of the poor. It helps the poor.

In the Zambian case, even the input study helped smallholder farmers, but not the smallest of the smallholder farmers.

Moderator: Which brings us to the next question, how convenient. What do these cases tell us about the tension between commercial pathways to food security and the ability to reach the poorest?

Daniel White: Yeah, I think – I mean this is just building on what Richard was saying. This has been a core issue. It's a core issue we're still grappling with from the current project. I think it's definitely something that comes out of the learning here, which is that back in the early 2000s, you really did have this bifurcated agricultural sector where you had these large scale commercial farms, and then you had at least from a government perspective and from a private sector perspective, they just looked at everybody else who would be producing on less than ten hectors. But at this point, we have a far more nuanced range of production systems, and I think you're having in a lot of these areas the kinds of standard emerging class formation that you get anywhere that's moving into a market system away from what is essentially subsistence production for so long.

And I think the short answer is that commercially oriented agriculture and increasing commercialization is never going to be a pathway out of poverty for the poorest of the poor as producers or as entrepreneurs who do like to – it's nice to think of it that way, but there's entrepreneurship in the way that it exists here, and then there's entrepreneurship because you can't find a job and are simply trying to scrape together as much cash as you can, and that's not necessarily the same thing.

And I would say it would be – what I am seeing in Zambia in terms of how do you reach those populations that are so much farther away from any of these market access roads, where the transaction costs are still extremely high, for the commercial input supply sector to supply even these emerging farmers, they're going to have to be hitting pretty significant tonnages per farmer to be able to really make the economics work from a purely private sector standpoint. So you're already looking at these people on the brink of becoming an emergent

commercial farmer still need to get a little bit larger than they are now for it to really be sustained by the existing market system.

I think it's very much worth looking into some of these other pathways to compliment this idea of agricultural entrepreneurship in terms of employment, in terms of some of these other things that are probably in the long run going to be more highly sought after by the poorest of the poor as a livelihood strategy and are probably going to be more viable from an enterprise standpoint as well.

Richard Kohl: I hope this was implicitly understood, but I just want to make it explicit that at least for me, and I think for Dan, we speak for ourselves in the studies we did enough for USAID.

Moderator: Of course.

Richard Kohl: So having said that, I think there is a real tension in this between the poor and the poorest of the poor as Dan said. However that's defined, whether it's defined by access to financial resources, whether it's defined by land size, whether it's defined by distance from the market on the input and output size, I mean one of the things that we always do when we look at the crop budgets is we do sensitivity analysis. So if you up the costs of outputs by 10, 20, 30 percent because of transaction cost and if you're not 10, 20, or 30 percent off of the prices farmers are receiving on the output side for the same reason, what effect you get. And the margins in Zambia are sufficiently small that basically once you start to get 50 kilometers away from these markets, these are not profitable for the farmers, and if FRA wasn't out there buying the maize at good prices, well, they'd still be growing because they'd probably grow it to eat for themselves.

But they certainly wouldn't be growing it on the size or scale or putting new land into production, which is what I alluded to. I think there's a real challenge both for USAID and other donors and for their implementing partners because of the timeframes of these projects. Basically they're trying to do two things simultaneously. They're trying to do what I would call even though they wouldn't call this humanitarian assistance, which there is these really poor tiny smallholder farmers that will never be commercially viable. And implementing partners are required to try to hit some number, 30,000, 50,000 of the poorest of the poor. In fact, the USAID zones of influence, the Feed the Future zones of influence was

specifically selected with very high poverty rates. And at the same time, they're also trying to use market systems and value chain approaches for which in my personal opinion, especially in grains, they will never be profitable.

At least not rain-fed. Irrigated, a whole separate question. We just did a study in Senegal, which I'm writing up, which that's a different story because that was all irrigated. But for rain-fed, and so I agree 100 percent with Dan, which is that this – call them what you want. Larger smallholder farmers, emerging farmers, et cetera, there's definitely a possibility of reaching them, integrating them both on the input and outside side of the market systems. But the smallest of the small – I think the long-term strategy is – that's why I said this is not USAID's position is that we know that they need to either find other rural employment or they are going to migrate out. And we see that as happening in some countries, and I think Dan is exactly right.

Whether it's creating alternative rural income strategies or other things that's key. And I just want to second what he said about the importance of bundling. In Feed the Future, I think because of the way it was originally designed, and understandably so, there was a real concentration on narrowing the number of value chains that Feed the Future projects worked. And the reason was because there had been a history of doing everything. Okay? And so I think we're learning now that the pendulum may have swung a little too far, particularly because there's been an emphasis on food insecurity, there's been emphasis on staple grains.

And as Dan said, nobody can really make money unless you are doing lots of land and particularly if you have irrigation or some sort of crop insurance. Hard to make money on stable grains either as an input supplier or as a producer. But if you mix in particularly a livestock, which for the input suppliers, walking around with a knapsack of veterinary medicine, the markups are huge on that, and the value to weight ratio is huge whereas you can carry 500 pounds of maize seed and you're never going to make a living off of that. Okay?

So if you don’t get the right bundles and start thinking about this from a whole different perspective, not how do we achieve scale in maize seed and food security, but how do we create a market system where everybody is making money. And as part of that, try to achieve food security, we're going to have serious – and continue to have serious problems in achieving the goals.

[End of Audio]

Q&A Transcript

Moderator: Thanks. And now we're going to turn it back to the audience for some Q&A.

Moderator: So I'll start out with a question from Robert Navin and it's kind of a clarifying question that could go to either one of you Dan or Richard and it's what is the definition of small holder in Zambia? And then a follow on question, what was the ratio of increased hectarage over time by small holders versus large scale ex-Zimbabwe white farmers and was animal traction of mechanized plowing enriching use? So pretty specific but kind of getting into the studies a little bit more.

Daniel White: Sorry. What was the first question again?

Moderator: The first question is what is the definition of small holder in Zambia?

Richard Kohl: If I can jump in 'cause I want to take the easy ones and let Dan handle the hard one. Large farmers no longer grow maize and haven't for quite a while. And the reason for that is because of the – I didn't get into it and it's complicated to explain but basically because of the FRA input subsidy scheme, buying scheme it's created distortions in the prices that wholesalers and processes are willing to pay for maize especially because sometimes as I alluded to the government dumps the maize at lower prices and it has made it basically impossible for large farmers to compete. Okay. And so they don't. They grow other things. They tend to grow other cash crops like tobacco or cotton or other things.

The animal traction issue is quite interesting particularly in southern province there are tsetse fly and other problems and at least when I was there a lot of the animal stock has been wiped out. So not only are they not using tractors they're not even using animal traction because it often takes them several years to be able to put together enough money again to be able to buy a pair of oxen. And so you actually have farmers growing a hectare or two or three using hand hoeing.

It's pretty basic. And there – so mechanization is basically not being used, certainly not in the southern province for maize. There is some animal traction and there is a surprisingly large amount of hand hoeing left. Defining small holder, I am going to pass that – I will answer it if Dan doesn't want to but it's a very complicated definition in Zambia.

Daniel White: Yeah. I mean I don't – I wouldn't be able to tell you what the government's definition, the Zambian government's definition is off hand. On the current project I'm not sure what the specific definition was on the previous project but under the current project it's two hectares or less. But yeah.

Richard Kohl: Well, I guess just then to amplify it does to be two hectares or less but as I alluded to the reason it gets really tricky in Zambia is because you can have farmers that have a fair bit of land but they don't cultivate it or it's not very good land. And then you can have farmers who have really good land that's close to the market. Even if it's only a hectare or two and are obviously doing commercial. So the standard definition has been small is less than five by the government and then emerging is five to ten and then bigger than that is considered a larger farmer.

But those land sizes don't really correspond to what you would like to think of as more – are they subsistence or even not subsistence? Are they food insecure or are they subsistence? And if they have a good year are they sell some or are they primary orienting to the market? And I suspect Michigan State has some numbers on that but I haven't seen those numbers. And I think that's the right question and there's only a loose correlation between the answer to that question and actually the amount of land they own.

Daniel White: Yeah. I think I mean because the current project works within field crops but also within vegetables. And unsurprisingly our vegetable farmers who are producing on maybe 2,000 square meters, closer to Lusaka have by far the highest revenues of on average of the farmers in the program that are relative to those that are growing field crops across two or three hectares. Yeah. I think it's at best a very imperfect proxy particularly when you're dealing with farming populations who have a wide range of options commercially of what they could be growing.

Audience: Dan you talked about what I presume was the early days of the project when there was a good amount of analysis kind of looking at the endogenous kind of what was happening on the ground and using that as the basis for their design. How did they approach the challenge of basically the tension between that approach and then kind of the common challenge of having indicators that were short term oriented and kind of pushing them to a particular sort of asked results direction? Did they have the benefit of a more enlightened design or did they sort of do things in parallel so that they were kind of trying to hit earlier indicators that were put into the project for year one? Or how did they approach that tension?

Daniel White: Yeah. So I mean it's a common problem that we run into, just trying to figure out how you're going to smooth out the implementation versus the results timeframe over the course of these projects. I mean this was only one set of activities within a much larger portfolio of other value chains that deployed a wider range of activities. And my sense from looking back – it's always hard to do. I wasn't there. But my sense looking back was that there was. There were still a lot more direct activities going on within these communities in terms of training and other things. But in terms of the – in terms of what they were doing on the input supply side this, that bought them some time in transit of waiting to see what would happen to the rest of us.

Richard Kohl: If I can answer a slightly different version of that question I want to come back to one of the last points Dan made on his slides which is the importance of a flexible approach. To foreshadow what I think is going to be the conclusion of the five studies that we're doing even though we've only done two is that we – because I know some of the other projects, some of the other cases a little bit.

One of the very strong recommendations I think we're going to be making is that USAID really needs to move to a very different way of designing it's procurements, it's contracting and particularly its monitoring and evaluation away from here's this amount of money. We want to see this number of farmers and these crops in this number of years. And here are the activities to – we want you to work in this sector and the overall goals are to move the numbers up on farmers' productivity, malnutrition, food security, etcetera, etcetera but how you do that we are going to renegotiate with you every year based on to use Dan's metaphor what the constraints are, what the waves, the riptides look like.

See, I actually liked – I think if we stick to the here's the top of the mountain and we've plotted out the path well, I've done – I used to do a lot of backpacking. I used to get lost all the time. Okay. I was always finding that – I was always off trail and then I'd have to take a compass reading and try to figure out where I was and have to plot a new course. And what we're seeing I like to call it the virtuous spiral approach which is okay. We want to go from whatever the numbers are, 10,000 farmers use hybrid maize to 30, 40 or 50 what are the constraints from that happening?

Well, right now there are no agro-dealers. So how can we make a profit for agro-dealers or these agents to do that? Well, that gets us only so far but then we discover maybe there's not enough breeder seed or foundation seed. Or the seed they're using is crappy 'cause the certification system doesn't work very well so now we have to work on the certification system. Well, okay. We get that going but now there's not enough credit for enough farmers to buy that so now we have to work on credit instruments. And the case I'm kind of implicitly describing or two cases actually is the economic growth project which was actually in French project *Le Projet Croissance Economique* in Senegal which did exactly that and I think the most important thing you can take away from that is that the Senegal mission worked very closely with the implementing partner. They sat down every year and say what are the constraints from us moving forward and they changed substantially the work plan and the intermediate objectives every year.

And we're about to do a study of the Bangladesh CSISA-MI project which was a mechanization project and the same thing. The project initially targeted maize and wheat farmers. They brought in a bunch of machinery services and the people who adopted them were rice farmers, fish farmers and horticulture farmers. And rather than say, okay, we have to stick to our plan and we don't care all these market results that you got that looked really promising.

We're going to force you to focus on wheat and maize and ram it down their throats whether they like it or not, whether it's profitable or not, whether the commercial sector is responding or not. No. We're going to take the commercial, the feedback from the market. If the market says rice, fish and horticulture let's go in that direction. If the market liked these two machines but not those two machines we're going to go in that direction. And that's what the mission did.

Now I think these are extraordinary. I mean if you've worked with people in USAID missions many of them are extraordinary but particularly in these two

cases really the flexibility and the willingness not to sort of just have that sort of soviet style central planning mentality – I sometimes joke that USAID contracts are the last soviet systems on the planet. Again I do not speak for the agency on that one. But our contracting mechanisms need to reflect a market approach that we are talking about implementing. And that means responding flexibly to feedback we get from farmers and other parts of the value chain about what's working and not as opposed to we're the experts, we have the solution, we know the objectives, we have five-year goals and we're going to get there no matter what the market says.

Moderator: The next question is from Simon Winter and he's interested in how carefully and purposefully the partnerships between government donors and the private sector in the studies that you looked at were structured or were the various stakeholders working independently and incidentally? So he would just like to hear more about that?

Daniel White: Well, in the PROFIT case the partnerships – I mean the PROFIT project was working with the Ministry of Agriculture in everything that it was working on in the sort of standard coordination that you would find for a project like that. But the partnerships with the private sector were very intentionally designed and they were all structured around MOUs and grants. Some of them were grants. Some of them weren't grants. Some of them were just an agreement to help design a partnership and help them think through some issues.

And so my sense was that at the margin obviously there's a reason why we tend to try to push to formalize these things particularly if we have to end up capturing results coming out of them from the private sector partner. But again that – I think there's a value to parsimony in those things too. Only formalize it to the extent necessary and then that gives you flexibility as you're moving forward.

Richard Kohl: So in the case that I looked at the garner role was pretty much confined to CIMMYT's partnerships with both the private sector companies on the one hand and they continued to work with the national research institutes that do breeding in Zambia and develop maize. Though because of the strong private sector presence the public sector role is much less than it is in other countries. And I want to highlight that. I think again as Dan said it's a contextual thing. I think you'd have to search pretty far and wide to find more than another two or three countries in Africa, for sure sub-Saharan African that have seed sectors that look anywhere close to the strength of the Zambian seed sector.

And so in this case CIMMYT was able to work closely but only on the breeding and research and the seed companies took the baton from there and did all the leg work in terms of marketing and distribution and sales. In countries where the seed sector doesn't look like that we've seen that the CG institutions, not just CIMMYT but others have really struggled because they tend at least historically not to be very good at commercialization or they tend to only work with the national research institutes and partners and they – it is the demo project solution and we've seen in the past that in the vast majority of cases demo projects are not sufficient to get you to critical mass and scale. They may be necessary but they're not sufficient. And so I think that's sort of the Zambian case may kind of be an exception that proves the rule.

Daniel White: Yeah. And I highlight as well that we're talking about the maize market because it's dominated by hybrids. You move into any of the other key crops like soy or ground nut, you still run into a massive problem. Any OPV, the market is just much harder from a seed production standpoint to make work and consistently – and obviously this isn't just in Zambia but there is every year, particularly years after there's been a particularly bumper grain crop so farmers are not holding back as much you have a chronic seed shortage within soy and ground nut and any other OPV as well.

So there's – I think there – I think in terms of thinking through the challenges and the market dynamics that how do we make a private sector seed system work? How do we link these research programs around improving germplasm to an actual commercial distribution system within OPV dominant crops? That's totally different and much more challenging question and I think is probably going to require a lot more public sector investment down chain for a lot longer until we can figure out how that works.

Richard Kohl: If I can just pick up on the OPV question 'cause it is extremely critical I think there's been a presumption in our sector in agriculture that the advantage of OPVs is farmers don't have to buy them every year and then you just sort of get them out there and then they just let them rip and the farmers just use the stuff over and over again. The problem with that is that especially smaller and semiliterate or illiterate farmers in the more remote areas do not really understand how to select seeds from the OPVs they're growing.

And so even though genetically so to speak the material may not be deteriorating in quality the way a hybrid will sort of start to revert to its parent lines over years de facto because they don't know how to – they aren't selecting good seeds. Two, three, four years later you're basically growing grain. And or whatever the plant may, the product may be. And what we've seen in a number of other countries – again I just was back from Senegal that the major thing – the OPVs that were put in place were put in the mid-90s but by the mid-2000s they were growing crap. And the major intervention was to put in very strong and very solid certified seed system. And the farmers are buying the certified OPVs in rice because they are so much more productive.

So this is I think a critical thing. And as Dan said this is something that often the very weak public sector systems have a hard time doing. And I think this is a perfect example of public, private partnerships or getting private sector heavily involved in seed production and seed processing and certification can be quite critical.

Audience: I just got back from Zambia. I was in the northwestern province travelling with some major input suppliers visiting smallholder farmers. And one of the folks that the folks who run the programs for these input suppliers trying to develop these markets – one of their immediate concerns right now is where we are in the global agricultural business cycle. And they're receiving – they're getting a lot more pressure to increase their profit margins from smallholder farmers and there is less tolerance internally for a long term investment in smallholder farmers.

So their concern is that over time they're going to be asked to cut back and pull in some costs and maybe they're going to have to focus most of their efforts on that emerging scale five to twenty hectares or the folks maybe that two to five hectares closer to major roads. So some of the places where we were in the northwestern province it's just not going to internally make sense given the new requirements that are being faced in terms of producing profits. So I don't know if you encountered any of that but I'd be curious to know what impact you think that might have on some of the programs you're running in Zambia or elsewhere?

Daniel White: I mean that core question of geography that Richard talked about, I mean it's more profound than just the input access. Right? I mean you're talking about just objective levels of poverty increasing the further out from these main roadways that you get and that's – it's not hard to understand the feedback loops between the distance from transport, distance from any not just markets but other public

services tend to be less, more politically marginalized the further away from these roadways you are. So I think that's – that is just a core issue. I mean the what I think is really important to not forget particularly from the donor side or an implementer in this project and partnership of these companies is that the transaction costs due to distance and do to quality of the roadways are beyond your ambit and they're beyond the ambit of the company that bids.

And so the first thing that you should be doing when you're trying to figure out whether or not if you're going to start trying to work out a partnership over the long term with some of these larger companies both buyers or input suppliers is you need to run the numbers and what that's actually going to look like for them to supply both in terms of time, logistics, fuel, staff, trucks. It's very easy for those costs alone to overwhelm the business case for them to actually expand into these areas. And in that situation you shouldn't be wasting five years of your project beating your head against the wall. You should be bringing those results to the government who is probably working with some sort of larger investment in terms of figuring out what their next 5, 10, 20 year infrastructure development plan is and say "Look. If you guys can extend this road out another 100 kilometers, we can estimate this impact."

So I do think there's a lot of ground in terms of trying to link up the value chain approach to some of these larger level other multi-lateral investment schemes that do tend to work more on an infrastructure side in trying to help them figure out how to most efficiently allocate those investment resources based on where we see these market failures that otherwise could be there could be solved.

Richard Kohl: If I could pick up on that I want to repeat and highlight something I said before and extend it which is depending upon how profitable the stuff is as you get 10, 20, 30, 40, 50 kilometers away from these roads the transactions costs swamp the increased profitability and basically nobody wants to go there. Mark was kind enough to mention that I've been helping BFS, Feed the Future Program for a while now. And particularly in the case of Tanzania where they were supporting rice among other things I think again in terms of how the agency goes forward with this we really need to change our M&E which currently the M&E is largely designed to produce accountability for the agency that the implementing partner is achieving its objectives.

But it's not designed to create a learning and feedback mechanism so that on an annual work plan basis missions and the implementing partners can make good

decisions and change work plans in reaction to what they're finding out. One of the key things is where to scale up the rice that they were introducing. And we didn't have data on where, at what point, how far from the road does the business case flip from a positive to a negative. So how can you decide to scale up if you don't have disaggregated crop budget data depending upon what kind of yield you're getting, what you're paying for inputs, how much of the transaction costs are to get your product to market?

And I think what we came up with on some – I'm an expert at back of the envelope calculations. Mark and I have actually huddled over a couple of spreadsheets for two days trying to get some handle on some of these things in several countries. Is that I think you need to – sort of to build on what Dan said like a fill in strategy. Right now it's profitable 20, 30, 40 kilometers. So let's kind of push that envelope. We'd like to think that if there's now enough farmers doing this stuff 20, 30, 40 kilometers from the road in 2, 3, 4, 5 years some input suppliers may create a business 30 kilometers away, 40 kilometers away which would then allow us to move the frontier another 10 – 20.

So to start to sort of think about this sort of layered or waved or – these are not the right metaphors. You understand what I'm saying as how can we help the commercial sector fill in as the roads get better, as the population density gets better, as critical mass is achieved so that input suppliers are willing to create businesses further and further out and move with that? But again that requires an M&E system which is measuring where are the input suppliers? What is the geographic gradient of the business case as you get away from roads and input suppliers and also the market on the output side?

And currently most projects don't do that because they don't have to and they're not being asked to do that question and they're asked being quantitative objectives. And then when you look at the numbers gee, isn't it odd that all of the small that they work with are within 20 kilometers of the road when in fact we ask the question are there contradictions between commercial approach and small holders. The answer is no as long as you're in a place where they can make money which turns out to exclude vast amounts of rural producers because the transaction costs become too high.

Moderator: We’re going to try to squeeze in two more questions. We’ll take a question from the webinar audience and then we’ll bring it back to in-person.

Moderator: This question is from Natalia and she was wondering if both of you could speak to whether there were any gender assessments in the studies that you looked at and how scaling up maize affected both women and men in Zambia considering the different accessibility to inputs land support, etcetera?

Daniel White: So we did – well, two things. One the presentation that Jennefer Sebstad did that I said is I mentioned is on Microlinks from several years ago did much more explicitly focus on potential gender dynamics between male and female agents and what those, what that implied for their relationship with female or male farmers. Were there any salient differences? There's some interesting learning that comes out of that so I'd recommend definitely taking a look at that.

We did try to – we did include some questions which tried to disaggregate some implications there particularly at the interview level where we were surveying farmers. So talking with the input suppliers and the agents, asking them about their strategies, several of them have started developed bifurcated marketing strategies where different branded things are distributed to women versus men depending what they wanted. And there was one funny anecdote where one of the maize companies was talking about how they – they were marketing a lot of their vegetable seed towards women and really highlighting the effects that it would have on their children's nutrition and all of the maize seed marketing was all about how big your maize is going to get and how large your yields were going to be. So there's a lot you could unpack there.

But the – what we ended up finding was that a number of the small holder farmers – the women small holder farmers that we talked to particularly liked the fact that the agents were within their communities and we did find that particularly within these communities which tend to be much more geographically constrained for women than men that that expansion of a geographic reach if you're within – if they're within the village, right, did seem to have an acutely positive affect on them. We didn't find any other particularly notable differences in terms of how the expansion affected them. Most of the input suppliers and agents had no – they were equally interested in male and female farmers. They didn't report any other differences in their approaches and so yeah. I think that was the only really notable thing that we found.

Richard Kohl: In general we looked at gender and I cannot tell you the number of focus groups discussions I had with farmers so – 'cause there are almost always women present. Do you have challenges in particular in adopting or implementing hybrid

maize seed that you feel have something peculiar to do? I didn't use the word peculiar but have something to do with your status as a woman. And by and large the answer was no. Zambia is not as heavily affected by HIV as some of the other southern African countries but in the cases where there widows present who tended – after I found out – I didn't ask them directly but found out indirectly that they were HIV widows that has been a problem.

And in general because women tend to have less access to financial resources one of the tricky businesses when you're talking about scaling up to an adoption is what does that mean. Okay. Are you using hybrid maize seed or not? The answer is usually yes. Are you using it – how many hectares of hybrid maize are you planting? Three. What percentage of that are you planting with hybrid maize versus hybrid maize seed that you saved from last year versus OPVs or traditional varieties that you have?

And generally speaking what you find with the women is that because they have less access to resources they're planting less. For the farmer the question is although I get my allocation from FISP which is enough for a hectare but if I have two or three hectares do I have the money to buy need seeds for that. And the tendency, the answer tends to be poor farmers and because women tend to have less access to resources the answer is often less of that additional land is being planted with hybrid maize. And also the women particular suffer from lack of animal traction. So those were the issues that came up.

The one thing I should mention is we didn't – Dan and I, I guess we're trying to be discreet but this program in particular has been – what is the nice word for corruption? Highly inefficient in many ways. And one of them is the fact that there's a lot of local discretion about who gets access to FISP subsidies. Well, legally I don't believe that both a husband and a wife are allowed to but in some areas I was they both got it. And in many cases the wife would give her FISP allocation to the husband. And then I would be in other places where even though the women would have their own plot in some cases I said "Well did you get FISP?" "Oh no. That's illegal. We can only get it one person per household."

So go figure. I just want to mention something briefly coming back to the seed certification. I forgot to mention that Zambia has an outstanding and extremely well regarded seed certification system which was again started in the '90s and actually a little bit before and a lot of the initial money and impetus and TA came from Swedish Sida and those buildings and a lot of that equipment unfortunately

which is now 20 or 30 years old is still there and still being used. And the private sector has been hugely supportive because when Zambian seeds are exported to Kenya or Zimbabwe or Malawi or – they want people to know that this is first rate seed.

And so in the last recent years because actually donors have not – neither the government nor the donors have really been supporting the seed certification the private sector has been helping in buying machines and updating the quality of the things. And one of the markers for this – at least it's the only country I know with the case which probably is just a question of my ignorance. But when agri-dealers receive their maize seed for the year and if they don't sell it all they are required to return it to the seed company and the seed company is required to recertify it for the next year before they can resell it. And at least of the countries I've worked in I've never heard of that before. So but I mean I think that gives you a sense of what's going on there.

Moderator: We'll take our last in person question.

Audience: You've been mentioning access to inputs throughout all of this and hybrid seed, hybrid maize, fertilizers I'm assuming. Sorry. And you did say too – I'm just coming from Zambia in February. Zambia is really trading space for these productivity gains. I mean they have a lot of forest they're turning into maize. What sort of things are you doing around say increasing the resiliency for those sorts of variability in rainfall? What are you doing say around climate smart agriculture and conservation? Because they keep dumping on more inputs and more seed but the yields bump with the rain so what are you doing about that?

Moderator: Yeah. So what are we doing with climate smart agriculture is what some of that comes down to. When we initiated this study we were looking specifically at drought tolerant variety adoption. It's coming along. It's hybrid first, drought tolerant varieties are following. I think that's where – and now there's research on the heat tolerant varieties. So we can hopefully through that kind of technology moderate some of the impact of climate variability.

Is it a solution? No. some of the things we can do, we are trying to do is just improve farm level productivity. I mean that could go some way to boosting yields enough so that farmers don't keep cutting down forests to plant maize.

Sometimes it's really basic things. When you do go to rural Zambia how many seeds do you put in a hole, right? I mean just real easy things that farmers could do differently if they've got the better technologies. They've got fertilizer. They've got seeds that are improved varieties that could help them up their yields more.

So there's some practical strategies. Is it going to – are we going to solve all of the problems? Probably not. It depends on you have a year like this last one where you have an El Nino. The impacts of that are – it sort of overwhelms the agriculture system. Is that a good enough answer?

Audience: I just wonder –

Moderator: So we've got a couple more –

Richard Kohl: I want to help Mark out here. I don't need a mic. I'm mic'ed. So it's complicated and let me say why. First of all what you picked up on is when we talk about I'm supposedly have expertise in scaling up. When we talk about scaling we distinguish what I call from intensive very extensive. Intensive being higher yields. Extensive being more inputs or particularly more land. Most of the scaling in Zambia has in fact been extensive.

As I mentioned the productivity yields have been – I wouldn't say low but 20 – 30 percent is not enormous especially over let's say five years, whereas the land surface has doubled. Part of that in my opinion is in fact because FRA has been putting out pretty high prices and also is buying in very rural areas for explicit political reason as we can get support in the most rural parts of the country 'cause we buy their maize. So that's complicated.

There is, has been and continues to be a very serious effort in Zambia of conservation agriculture. The conservation farmers union is out there pushing it and a number of other projects. But here's the problem. Okay. Remember if we circle back to the beginning of those whole presentation particularly the focus of our studies and I think implicitly – Dan will speak for himself – has been focusing on scaling up through commercial pathways because as a donor or I'm not a donor but as donors that I work for we don't have the resources to reach

millions and millions of people. So how do we get enough of a critical mass and enough commercial buy in for that to go to scale?

Well, you can see how people make money off of selling hybrid maize even with the issues we've raised about the distribution networks in rural areas and transaction costs. How do you make money on scaling up conservation agriculture? Okay. And that has been a problem. And the farmers are not that interested. I mean the ones who have been shown it are interested in it but the other thing about some of these things is when – I'm an economist by training and I really want to second what Dan said at the very beginning. You really didn't need to take a multi-sector, multi-disciplinary approach. The short answer when people say well, how do you scale stuff up I say hire an anthropologist, okay, not an agronomist.

And the reason for that is even in conservation agriculture not only do people look at crop budgets but they really look at risk and they also look at the demands on their resources particularly labor. And at least the perception rightly or wrongly and my understanding from the experts is wrongly is that conservation agriculture is much more labor intensive. Okay. That's what the farmers perceive. That's not what the expert is telling me but the farmers perceive. And they are busy. Okay. It's not like these guys are sitting around during the land prep season saying "Geez. I've got an extra six or eight hours a day. I could go dig some holes. I could dig these basins."

And so this notion that we don't understand that it's this top down expert technology, agronomist driven thing as opposed to what are the real challenges that farmers are facing and how do we work with their constraints whether it's on land, labor, if they're women intra-household to resources and decision making. If you don't understand those things then you don't – that you think look guys. This seed grows four times more. Well, actually it's only 20 percent more because all the other things you need to get to four times more you don't have access to. Well, what about the labor demands? What about access to inputs? Where am I going to sell this stuff? How is it going to affect my risk? If I put another $1,000.00 in inputs and I have a bad season and I go bankrupt what does that do for me then?

Okay. So those are all of the questions that we need to be asking and crop budgets just scratch the surface. Not to mention the fact that the crop budgets change when you're 30, 40, 50 kilometers from the input and output market. So a

much more sophisticated nuanced understanding of the "calculation." They may be illiterate or enumerate but these guys know what they're doing and they are making those calculations in their hand about land, labor tradeoffs, risk calculations and we need to really understand what their decision making process is. There's been a revolution behavioral economics that as far as I see it has yet to really reach the ground level on a lot of agricultural projects.

Daniel White: And just really quickly to add on so just to be clear I also work on the follow on to the PROFIT project which is implemented by ACDI/VOCA called PROFIT + and under that project we are pursuing a lot of things around this issue. So we've got several field trials looking at inter crop and with pigeon peas as a way to try to reduce some of this synthetic input- use. But what you're really talking about is what's known as Jevons paradox where increases in efficiency lead to increases in consumption in this case in land and it's been a core problem around I mean the idea that you can somehow as farmers start to make more money off of their existing land holdings constrain the amount of land that they're going to put under production moving forward when it's now just now starting to make them money is – I don't know anyone who's actually managed to sort that out. Look at the Brazil case as ….

So I think that the real key is going to be figuring out in the long run we know that in commercializing in agricultural sectors like the maize market in Zambia you're going to have pressures on land, putting more land under production. How do you reduce – how do you reduce the impact of that land that's, the impact on that land as it's going into production? And that means shifting into more sophisticated and complex cultivation systems, working on some shade growing agri-forestry options. And there's a lot of interesting research going on and I think hopefully this next year or so we should be getting some really good learning on that that we'll be talking about from a project perspective as well.

Richard Kohl: Okay. Just to add a word on that a lot of the USAID Feed the Future projects that I've seen have a strategy to try to help farmers get a high enough increase in productivity on their subsistence grain or their stable grain for them to move into horticulture. And then say that oh I'm making so much money on horticulture I don't need all this extra land and all that. And it's – talk about context dependent. I mean it really is a complicated calculation.

In some cases where they've developed horticulture activities or dairy or other things like that that are high money makers the farmers refuse to get out of maize

until they're – or even decrease the amount of maize they're producing. And in other places the way to get them to increase productivity is actually to go to horticulture first. So what's the right pathway? Is it stable grains and then it's the higher value added stuff like hort and dairy? Or is it hort and dairy, wow, this is so attractive I can now get out of that? And the answer unfortunately is actually its very context dependent and it really depends.

Moderator: Thank you again Richard and Dan and thank you everyone for attending. Thank you.

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