



# **Scaling the Uptake of Agricultural Innovations: The role of sustainable extension and advisory services**

## **Presentation Transcript**

**November 20, 2013**

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*Julie McCartee:*

All right, good morning, afternoon and evening, everyone, and welcome to the November edition of the Ag Sector Council seminar and webinar series. My name is Julie McCartee and I am a knowledge management specialist with the USAID Bureau for Food Security. I'll be facilitating the webinar today, so you'll be hearing my voice periodically and uh, seeing a bit of me in the chat box, and we also have our team from the Feed the Future knowledge driven agricultural development, or KDAAD project here in the webinar control room today. They'll be helping out with various web tech issues, chiming in in the chat box, as well, so you'll – you'll see, uh, some messages from our whole team. Today our topic is the role of sustainable extension and advisory services in this, and scaling the uptake of agricultural innovation and this is the third in a three-part Ag Sector Council series focusing on the topic of scaling, which has been a very hot topic, uh, at the moment in the ag development world, and so we'll be sure to share the, uh, the previous two, uh, seminars on this topic in the chat box and in our post-event e-mail so that you can kind of see the whole series of events if you were only able to join this one today. We'll be introducing our speakers in just a moment, but first a few quick reminders. Uh, first off, the PDF of the PowerPoint presentation, uh, that we're sharing today is in the file downloads box on the left side of the screen there, if you'd like to go ahead and click on it and select download file. We'll also, um, put that back up at the end of the webinar if you'd, uh like to wait until then to download it. This session is being recorded, so if you, uh, would like to be able to review any of the content later or share it with your colleagues, we will have the recording up on Agrilink, um, within, uh, probably by the end of the day and then we'll make sure to, uh, share it out with all of you via e-mail as well. If you'd like to tweet along with our event today, uh, please feel free to use the ag events hashtag. It's on the, uh, in the presentation screen right there on the left. It's #agevents, and we hope to have a few people chiming in via Twitter. If you are a, uh, big Twitter user, also feel free to share your Twitter handle in the chat box for others to follow you, and um, and if you have a personal website or LinkedIn account, we definitely encourage networking and sharing of those items in the chat box. All right, lastly I'd like to call your attention to just a few upcoming events, uh, that we wanted to, uh, raise your awareness of. Actually tomorrow we have an all-day learning even on the women's empowerment in agriculture index, that is cohosted by the International Food Policy Research Institute and, uh, USAID. You need to register for that event, uh, for the webinar portion by the end of the day today. The link is there on the screen, just in case any of you are interested in the WEAI, uh, and how it's uh, been helping inform our indicator work and our

monitoring evaluation. We also are e planning a Twitter chat for next week, uh, with the Development Credit Authority, and uh, we'll be sending out more e-mails about that. We're still working out some of the final details, um, but noon, uh, next Tuesday should be our Twitter chat, and then our December Ag Sector Council will be focusing on the Farmer to Farmer program, which, uh, has raised a lot of interest recently. Some new awards have been given out and we're excited to showcase, uh, a few different angles on Farmer to Farmer and that will be at our usual 9:30 eastern time on December 11th. All right, um, one final reminder is that we of course ask you to put your, uh, questions and comments in the chat box at any time. Uh, if you have a question in the middle of the presentation, feel free to enter it, but we may hold questions until after our first speaker or towards the end of the presentation, depending on, um, when we think it's most appropriate to answer them. And if we're not able to get all – to all of the questions, uh, during the course of the webinar, we will definitely track them and keep the chat transcript and uh, do our best to answer them after the event. All right so now to give a very brief intro to our topic and to our speakers. I'd like to invite, uh, Suzanne Poland to open up her microphone. Uh, Suzanne is with the country strategy and implementation office at the USAID Bureau for Food Security and she is a team leader for ag extension, and so she's an appropriate person to, uh, to kick off our webinar today. So Suzanne, please go ahead.

*Suzanne Poland:*

OK, good morning everyone. Um, today we're going to talk about a – a topic that is very hot these days: food security, eliminating hunger, reducing pro – poverty. Um, we have a lot of governments, donors, private sector, non-government organizations, civil society, all trying to make decisions on the best ways to invest funds to bring about this transformational change that can eliminate hunger and reduce poverty, and all are making decisions on the best ways to invest these, um, these funds. Extension and advisory services play a role in agriculture sector growth, but do we know enough about the role of extension and advisory services and how much or how little should be invested in these services to meet the challenge of eliminating hunger. We need to use evidence-based direction to guide investment priorities and programming options for extension and advisory services. The webinar today, Scaling the Uptake of Agricultural Innovations: The Role of Sustainable Extension and Advisory Services, will explore some of the evidence. Our two speakers today, Dr. Paul McNamara and Dr. Brent Simpson, are the director and deputy director of the USAID modernizing extension and advisory services project, known by the acronym of MEAS. Um, Dr. Paul

McNamara is the, um, is a – an associate professor in the department of agriculture and consumer economics at the University of Illinois at Urbana-Champaign, and he is talking, uh, to us today from Urbana-Champaign. Um, Dr. McNamara holds a PhD from the department of, uh, applied economics at University of Minnesota and a master of, um, MPP from the Harvard Kennedy School. Uh, Dr. Brent Simpson is an associate professor in international development at Michigan State University and, uh, he has, uh, extensive experience in Africa and, uh, will be our first speaker, speaking to us from, uh, from Michigan State. So I'll turn it over to you, Brent.

*Brent Simpson:*

OK, thank you very much Suzanne, and everyone, um, and good morning, this is my first, uh, webinar only presentation, so I'll, I'll do my best. It's a bit, uh, surreal from my side, but uh, I suppose this is, uh, the world's largest, at least for me, conference call. Um, let me advance the slides here. Uh, just in terms of helping to – to think about what's coming up in my presentation, um, I really organized this into – into three parts and the – the first and last are probably the smallest. Just want to put some ideas before you, uh, to think about as I go through the other slides with regards to scaling and how we think about scaling, how we plan for scaling, how we measure scaling. Most of my presentation is going to be talk about important concepts and principles, and uh, I think this is giving you more of a ground, uh, a ground level view of, of, uh, scaling activities and the role that extension and advisory services can play. My colleague, Dr. McNamara, will come in and talk about some other areas, uh, related to the agricultural sector and investments, and particularly, uh, those relevant to public and private sector extension programs. And lastly I'm going to come back in and talk about some of the applications, principles in practice, so without further ado, um, these are some key questions and I guess you'll hear in the slides to come, uh, what I feel about these, these issues, but I'd like all of you personally, individually to reflect back over what you know, what you've experienced in your careers and begin to think about, you know, or, or re-examine perhaps what you think about scale, how you've personally defined it and particularly how it applies in your different domains, whether it's a kind of project, uh, related activities or with – whether you're with a larger programmatic, uh, setting. And secondly, also go back and think about how we have in different points in time begun to design for the potential of scaling, how we have tried to lay the foundations or, uh, put the appropriate, uh, measures in place to allow scaling to happen during our different, uh, interventions, and then finally, think about how we've approached at different points of time this issue of sustained

momentous scaling where it's behavior change. Once we set that in motion, and this is a particularly important are that, uh, Dr. McNamara's going to speak on further at the end.

OK, to start off, I just want to remind us all that agriculture is a bit, uh, is, is a bit unique when we consider other sectors of the economy. Uh, it's really a place-based function, and it's probably important for all of us to keep in mind that when we think about agriculture, there really is sort-of a natural site to activities, uh, what farming households do, and also the relevancy of particular technologies and with most of our agricultural focus is on crops, so really defining where species are, are able to grow, and this relates to rainfall, temperature, soils and all these sorts of parameters. In addition to where species are able to grow, we also exert a certain amount of influence in making decisions that determine where species are allowed to grow, and some of the forces that are implied there are the elimination of species that we don't want, the addition of species that may not have been present that we want to have present in that landscape, and then the manipulation of the growing environment to allow those species that we desire to – to grow and prosper, and this really is where I want to focus our attention because this is the majority of person influence over the environment, so we have innovation occurring, where we have the diffusion of innovations occurring and where we can begin to think about scale and the impacts of scale of any particular innovation.

So back in the beginning of time, at least my professional experience, um, I grew up during the farming systems research and extension period. We actually tried to understand what those sort-of natural site conditions were, uh, that supported different types of farming systems and we did a lot of studying about the physical environment, uh, we looked at the biological interaction within that physical space and how different economic forces allowed or disincentivized different types of activities, social interrelations that allowed people to do different things at different times, uh, with different sorts of, uh, resources, and the importance of the institutional policy excellent. So this was – these are really analogous to, uh, some of the natural site conditions that, uh, allow different types of inter – interventions or innovations to actually take place.

Now, within that natural site of where a particular innovation – innovation can, uh, prosper, we have a number of other characteristics, and these are the elements that of, we'll say that they're related to choice, where individuals and households begin to, uh, determine what innovations they will actually use in their

farming practices. Relates back to household characteristics, preferences, uh, tools that are available, the land base that, uh, is under the control of different households, household units, uh, amount of labor of the family size that an individual can command and control, uh, capital, assets, uh, and then, you know, a lot of this led into the, uh, portfolio or selection of farm enterprises. You'll see a lot of these, uh, elements here are sort-of the building blocks of what came later in the, uh, livelihood framework approach.

Then you began to combine both the sort-of natural site aspects and some of the social economic limiting, uh, choices, uh, what we really came down to was the definition of a recommendation domain, and it's a nice little catch phrase, but that is really the area, the space within which, uh, we framed research questions and to the extent that the research generated, uh, useful outputs it helped to orient, uh, extension programs in trying to promote or extend those innovations to farming populations that shared a lot of the same attributes that were, uh, placed within a very similar sort-of landscape, similar features, and it's really for our purposes today, uh, it helps to define what's the potential adoption domain. So these are just some sort-of concepts I want you to begin to think about when we think about agriculture. It's very different than, uh, industrial, uh, countries, urban populations where we talk a lot – a lot about consumer goods, uh, cell phones and refrigerators, things like that that really don't have any spatial limitations applied to them. And this is a bit of a stylized, uh, diagram here but if these are farms or the little dots out there are farms or households, uh, we can begin to look at those that share enough commonality that you can lump together as a sort-of recommendation domain where a particular innovation might become viable.

Um, every innovation has its natural scale of expression, um, where it is applicable and where it's not, uh, in addition, no innovation or no – no innovative change is permanent, OK, so I you think about for example, climate change. Climate change is going to restructure the natural site of where innovations or technologies or practices are viable across their surface. Uh, changes in, uh, prices with – in response to, uh, food security or food pressures to feed a growing population are going to change the decisions that individuals make with regards to allocation of their resources to respond to market prices, and the same can be said for a lot of other things. So not only do we have innovations replacing each other through time, but we also have a restructuring of where different innovations fit into this landscape at those different periods of time. Very malleable environment and we can't lose sight of that.

OK, moving on, this is a good old friend, Ed Rogers, uh, who actually spent some time, uh, at my university, Michigan State University, along with, uh, a lot of other universities, and he really helped us, uh, a great deal and I'm going to feed off of his work because it's one of the foundation, uh, theories or uh, perspectives on how behavior change takes place in farming systems, and we've probably all seen his bell – normalized bell graph, uh, going from left to right where we have innovators picking up a new idea, new technologies, and moving into the early adopters, early and late majority and the laggards coming at the end, and I don't want to spend too much – I won't spend any time really talking about their characteristics of these different groups, but this is really derived from empirical research, looking at the common traits, behavior traits, uh, that these different groups of adopters share, and in the one sense, this is very – this is very obvious. I mean, somebody has to be the first to adopt a new practice and someone has to be the last, but this helps us to begin to think about the whole adoption process and the way that we can begin to capitalize and make use of, I mean, our, our development planning, uh, uh, activities.

One thing that I do want to point out is that there is a very distinct set of characteristics shared by the innovators and early adopters that are very different from the other groups who adopt practices, and one of the challenge really is in the promotion or tracking the spread of a particular innovation is that they can migrate from this sort-of pioneer or advance group back into the majority of others, and from different studies, uh, particularly with consumer goods, not the agricultural sector, but what we see is that after about 20 percent, once you've hit about the 20 percent mark in terms of adoption of a new – of a new technology, or a new good or service, within the population, that, that you really have successfully bridged the gap between the pioneers, uh, experimenting with something and the bulk beginning to buy in to, uh, the same practice, and, and you know, if we want to reflect back about tipping points if they do exist in the agricultural sector, it's probably somewhere around this area where you can begin to see rapid or very successful, uh, take off of different technologies.

Looking back through history, uh, we can see that all, uh, different technologies, uh, uh, shared different, uh, uh, uh, pathway, um, on the far left, sorry. On the far left, we have, uh, 1990, uh, or actually there, 1900. Have a little arrow here, let me grab that and see if I can use it. It's not wanting to move. Uh, in any event, um, this is some of the early technologies that came into the, uh, US

consumer landscape, uh, electronic nature, it's telephones and uh, over here on the left you can trace that from the lower left to the upper right, it really took about 100 years for them to be, uh, widely diffused across the US households. Very different from the trajectory of the uptake of cell phones over on the far right which over a 10 or 15 year period achieved about the same level adoption. What this graphic is getting at is that it seems to be that the pace of behavior change, uh, is, is increasing. Now, whether this transfers into developing countries, um, into the agricultural sector, amongst the, uh, uh, poor households, is, is something that is not proven, um, but perhaps through the different media, radio, televis – telephones, television, newspaper, that people are becoming more quickly aware of new options and they're beginning to make decisions and act on those more rapidly than they did in the past. Um, if we take one of those technologies out and this is a graphic of US smartphone adoption, uh, what we see is the overall same adoption curve for smartphones but within that is the changing market share of different, uh, cell phone, uh, sellers, or different cell phone platforms. And I think the, uh, important here – important issue here is, uh, for extension, when we work in pluralistic extension systems, because we have a multitude of different, uh, providers of information, of materials, and that – their relative importance is changing and fluctuating vis-à-vis different technologies but also through time, different, uh, audiences, and so you know, there is a bit of competition for – for consumers here and uh, relative importance, and I think that's important particularly when we get to monitoring and evaluation. We're not just looking at the penetration of technologies but we're also looking at the relative importance of different providers across that landscape.

OK, so how does process, uh, how does adoption take place? I probably should say that I want to differentiate and make sure it's clear the difference between adoption, which is an individual decision to uptake a new practice or technology, and diffusion which is the sum total of many individuals, uh, making that same decision. So first we're – we're looking at it from the behavioral perspective of – of the individual, and how – what individuals go through in terms of deciding whether to adopt a new practice or not, and initially, uh, you know, it's – it's a five step process, but initially they begin – it's very important to become aware that a new option exists, that they're somehow interested in what that new option offers. Um, they begin to do an – a bit of internal evaluation of whether that innovation really fits into, uh, their farming practices within the tools and resources they have available that helps them to meet particular goals, and then it

passes that test, and you come into a phase of trial, um, trying to test out if it's possible to test out a new technology or practice at a small scale, and if need be, this is where the, uh, adaptation occurs, and for non-hard and non-lumpy technologies, um, you know, take an example of equipment or, or new varieties, but those practices that can be adjusted and adapted, that's often a very important phase in the testing or experimentation of the new practice, and if it proves to be, uh, valuable at that point, gets adopted gradually, uh, across the entire farming practice. This same set of – of five factors happens with each of the different adopted groups, the innovators, the – the early adopters, the different phases of majority and the laggards, so this is what individuals in deciding whether to take up new technology or not. Interesting question then, is how many dissemination efforts explicitly are designed to facilitate this individual adoption process as part of their theory of change and I probably should underline theory of change, whether that really exists in a, uh, effort or not and I – I think we would be surprised at the answer to that question if we ask it honestly of ourselves.

So how does this happen, uh, over time? And again, this is a nice graphic from Rogers on the adoption of pesticide use practices amongst Iowa, uh, farmers. The leading edge, uh, is when the different groups, the innovators in the lower left to the laggards in the upper right, became aware of pesticides as a new innovation. They didn't all become aware of that at the same time, oddly enough. Uh, the back edge is actually when those different groups, um, made the decision, having gone through those five phases of when to adopt a practice or not and what we see is that the innovators up through the laggards required different periods of time to go through those five stages in coming to a decision of whether to adopt or not. So not only do they become aware of the technology at different points in time, but it also takes some varying lengths of time to come to that decision. Innovators can do that within two years, laggards take over there, uh, and with agriculture, when you have a single point of observation in the agricultural calendar, seed germination rates, or whatever it is, you can only make an observation once per season. Uh, this becomes very critical in capitalizing on this observability feature. And again, if we ask the question, how many of our projects are designed to allow adoption to take place in terms of their overall structure and time path, let alone to really take off if we want to hit that 20 plus threshold where things really become embedded in a farming community or population, I think the answer to that question would be very interesting.

So I mean, we all take different approaches our – we use different models in our planning, some of them are based on sort-of an expansion, uh, uh, uh, uh, theory of change where we try to release something and push its expansion every farther outwards. Uh, there's other approaches where we try to replicated, um, the diffusion process by uh, planting the seed if you will in different locations and helping them to grow and expand, um, but again this is coming back to the strategies that we use in our different programs to enable scale or scaling to happen and we often don't think very much about this, which is – I find troubling. It's good to remind ourselves that every technology has its own, uh, sort-of pathway that it follows. It follows different rates of, um, adoption, and it hits different populations or the size of the – or the scalability of it – the innovation is different. And a lot of this has to do with some of the characteristics of the technologies themselves, their relative advantage in terms of how they are perceived by potential adopters, the complexity of the technology, the riskiness of adopting it, uh, the trialability, whether you can try it on a few trees or a small, uh, plot of land or whether you actually have to adopt it, uh, in total at one time, and the observability, uh, of the impacts or the benefits delivered. All these things begin to impact the rate of uptake,, uh, buy the different groups, the innovators to the laggards, and we again need to think about this when we design our programs and here's another interesting question. There's lots of interesting questions, but how many interventions we can incorporate, the essential characteristics of an innovation, into a diffusion strategy, we actually modify what you're doing to make available and promote a technology based on the specific characteristics of that practice or technology. I think the answers to that and some of the other questions would be very important with us in terms of us being able to facilitate scaling and to achieve, uh, scaled impacts.

Um, want to give a little shout out or, uh, tip my hat back to David Corton in his learning process approach that helped to focus 30 some years ago some of our attention on the scaling issue. And first of all, our, our initial challenge is really to become effective to use those observed principles of human behavior to help stimulate behavior change, just doing that well in the first instance and it starts with having a good technology. If you have a bad technology it's probably best if nobody adopts it, so you know, getting the technology right but then helping it to get into the hands of the right people in the right ways, being effective. Um, secondly is becoming efficient, you know, trying to, uh, through really understanding the adoption process or diffusion process helping to compress the rate of time with which uh, it takes to

spread technologies within target populations. And the other side of this is also allowing sufficient time for technologies to diffuse and develop, so we really have two sides of that and you can be very inefficient by not allowing enough time.

Lastly is the whole scaling up process and again, there's probably no technologies, agricultural technologies out there, uh, that are 100 percent viable for countries or regions, uh, even a locality's population. Every technology has its natural fit, socioeconomic fit, degrees of fit and those digress of fit will change. As I mentioned, climate change will reshape where technologies are viable. Policies can also reshape, uh, where technologies are viable and perhaps one of the best examples of that, uh, is in Niger. Uh where a simple policy change regarding, uh, resource tenure rights over trees led to, uh, massive greening of southern Niger, very little to do with the 20 years of promoting regenerative, uh, practices on farm, it had to do with, uh, people not having, uh, legal rights over the tress that were on their farms and then that changed, it was massive takeoff of the technologies, and that's an idea about helping to shape or change the adopt – potential adoption domain as much as promoting that. So just in sum, really want to continue the dialogue about what extension, agriculture extension service providers can do in terms of using what we know about human behavior to support behavior change, using what we know about diffusion of innovations to help better design our projects and interventions. Uh, sustaining efforts long enough to allow scaling to happen and finally working out scales in order to achieve scaled impacts, the notion that we can target, you know, 12 villages with a favorite NGO or three districts in a part of a country and get nationwide impact, uh, is false. At some point, we need to work at the scales which we hope to have impact, and if we want to have national impact then we need to begin to think about how we can move towards national implementation and the role, then, of public sector extension and other players in being able to hit those scales is very important. It's not either or, amongst these and other factors, it's all and, and so a lot of this is having discussions like this to understand what pieces of the puzzle are out there and how they need to be fit together over time, um, is very important, and last, uh, you know, we had this bit of fetish about innovation itself, um, and oftentimes we have a lot of the answers already out there, we're just not using them. So applying what we already know or is known can be a very innovative practice, uh, or behavior change in itself. I'm going to stop here, uh, and pass the microphone over to my colleague Dr. McNamara, who's going to carry on the discussion into, uh, the next areas. Thank you.

*Paul McNamara:*

Move the conversation more to the side of financing of extension service and how that links with the scaling of agriculture innovations, um, raise some different approaches we're seeing and also raise some questions and issues for us to think about together. Um, first by way of motivation, a couple quotes around the financing area for extent – extension. Uh, a review done in 2007 by some, um, economists from Oxford, England pointed out looking at ag spending in sub-Saharan Africa, um, looked at the quality of spending and – and they asserted that the quality of spending to agricultural is more important than the overall level of spending. So as we're thinking about financing large scale extension systems and other ag services including research systems, um, having some attention to quality in – in our, um, thinking is important, and another quote by Carl Eiker, um, pointing out the importance of the history in the institutional perspective that I think is useful in this type of discussion. He said, “Most donors have a strictly a historical view of development, they lack an institutional memory.” A lot of our projects, um, are short term in their funding frame and time frame, um, and are designed to be independent, standalone things, um, and he's pointing out the need for a longer timeframe, um, and appreciation for the history of the context we're operating in, the importance of institutional development.

What I'd like to do is make some observations about extension in two examples of large scale agricultural innovations, then um, from those derive three stylized facts about extension in large scale ag innovations, then point out some elements of a conceptual framework, to think about sustainably financing extension activities, extension work, and then make some observations about what we're seeing around the area best fit approaches and some examples in countries where MEAS is working or we're engaged and then some wrap up. So first, innovation I want to talk about is, um, in the period 1930 to 1960 the dramatic increase in mechanical power in US agriculture. You see on the right pictures of, um, a farmer tilling and uh, a mowing tractor ad, um, but look at the – the rate of adoption over that, uh, 40 year period from 920,000 tractors in the US to 4.5 million tractors in US agriculture in 1960. So, uh, dramatic in terms of, uh, a social phenomenon. A dramatic increase of huge substitution of mechanical power for farm labor, and it was associated along with other things, the – as Brent just showed a slide from Iowa about, uh, pesticide use, fertilizer chemical use at the same time, but uh, dramatic productivity increases. 11 percent over the decade of the '30s, 25 percent, um, over the decade of the '40s, and 20 percent in the '50s, 17percent in the '60s, and it's, um, important in looking at this time period of

agricultural history and trying to understand the extension contribution, um, to understand there was a lot going on. There were the researchers, the companies, the legal framework, um, the markets especially during the war period where prices were very high and labor became more scarce that induced a lot of substitution of power for labor, but extension provided a role linking training, advocating for technology and advocating for farmers to companies and to researchers and helping with experimentation and it's important to realize that, um, this process was not – there wasn't just a well defined tractor at the beginning, it was an iterative, ongoing process of technological advancement that extension was involved in this linking, framing and very applied research and experimenting role. ]

Second innovation to consider is the green revolution in Asia, and from the late, uh, late war period, 1943 to 1980, a dramatic increase in we – in rice yields, in developing countries in – in Asia, and the green revolution was a package of technologies, improved varieties, fertilizer, irrigation, chemical inputs, extension support, uh, supportive public policies, as Brent just mentioned the importance of the policy environment and also rural infrastructure, roads, water infrastructure, on a very large scale. What extension did in that time period was link researchers farmers iteratively and both delivering the technology but also delivering the feedback from farmers back to the research systems, providing training, and support on the application of technology. Um, it's important when thinking about, uh, green revolution just to appreciate the level of public support. 15.4 support of Asian public spending in 1972 was on agriculture and we can think about the context we're working, many of us, in Feed the Future countries, think about the level of public support in those countries, it's often very different from this type of level of support, and, um, the increase in yields over this time period were dramatic, from 500 kg per hectare in 1950 for wheat in developing countries to 2,500 kg per hectare in 2000, and one of the key roles of extension in the green revolution was really a targeting role to reach small farmers who maybe weren't the first adopters but helping reach, uh, those mid adopters and the late adopters and pulling them along and targeting to help reduce poverty.

A couple stylized facts out of this. One, the importance of the institutional base of extension in all the complementary services and inputs, along with the enabling environment, the policy environment and the – the broader enabling environment, and that in both the mechanical, um, adoption in the US and the, uh, green revolution in Asia you see many components of a functioning

agricultural innovation system at play. Um, commercial firms, research systems, extension system, an enabling environment that was positive for agricultural innovation, many of these things were in play in both of those, and when we look at innovations, um, in both the mechanical one in the US and the green revolution, um, appreciate the system at play and the nature of the process that for tractors there is a treadmill going on with continuing, um, evolution and improvements in the technology over that 30 or 40 year period and iteration and that extension had this role of linking not just in a one-time teaching about it technology, but in going back to, um, equipment companies and helping them refine and get information, going back to university researchers that were looking at specific implements, testing and providing that linkage role. Extension had an important role there. So it wasn't just a onetime push of a technology, but it was a system that was developed for innovation.

Another, in – um, stylized fact is to appreciate the longish time scale for at least these two major agricultural innovations. Brent, um, provided us some information about consumer adoption of new technologies, but in place based adoption we're complementary investments in order to adopt the technology, for example, improving irrigation systems, in themselves take a long time. Um, the time scale at least in these two phenomena that we looked at are longer time – time frames for major adoption to happen. And then third stylized fact is look at the people and their assets. The green revolution in Asia really was targeted to the best agricultural regions in – in south Asia, in southeastern Asia, um, for irrigated rice and for wheat production, and didn't target the more difficult, rain fed uplands, uh, any semi-arid zones and more marginal zones they didn't get the attention that the best agricultural regions did. Similarly in the US, that dramatic increase in productivity over the – the 40 years, 1930 to 1960, built on, um, a very literate farm population base. The human capital was quite high. People have secure property rights in their farms, they had functioning agricultural groups and organizations, they had, partly due to federal policy, access to credit over that time period, there was substantial commercial agribusiness involvement and investment in it, public infrastructure and public financing for the entire innovation system, the research part of it, and uh, the extension system. So we need to appreciate that when we think about, um, these large scale innovations.

Now, in talking to people in our work with MEAS oftentimes we see people have somewhat truncated understandings of exactly what extension is, and um, we like a – a broad definition of

extension. We like the definition that Ian Christopolos used in a FAO article, um, where he talks about extension is all systems that facilitate access of farmers to organizations and other market actors to knowledge, information, and technologies. It facilitates their action, interaction with partners in research, education, agribusiness and other relevant institutions and assists them to develop their own technical organizational and management skills and practices, so extension is, um, a set – a broad set of activities. It's not just one approach, it includes tools such as ICT, or specific approaches such as farmer field school, non-formal education approaches like that. It includes facilitation extension, organizing farmers into groups, into associations and then into businesses. It includes the training and visit method which was used in the green revolution. Um, it includes individual farmer advisory services, so um, a broad definition, but importantly, uh, many times we see a working definition that people are using is basically extension around training for input use or even sometimes distribution of inputs, extension is much broader than that.

Um, and extension includes facilitation extension, and training and things like natural resource management. We can think about extension is what economists call a toll good. It has elements of a public good, but it's – it can be site specific, that's the idea of a toll, where you're providing farm specific information about soils or drainage advice, for example, or farmer group specific work and in those sense it can be, um, very targeted and it differs a bit from a public good and there's a wide variety of extension services, but one of the features of extension services is that they necessarily involved a high degree of, um, discretion on the part of the extension agent, or facilitator. They involve face to face interaction or personal communication with farmers, and one of the challenges because of that element of extension services is, um, the challenge of ensuring good performance, high quality, and that's one of the challenges we see in many countries today.

Another aspect of extension as an economic good is to consider its, um, merit good element. A lot of our extension programs have explicit goals of poverty reduction, reaching the rural poor, assisting marginalized groups, um, and that's evidence that we're talking about extension services as a merit it good type of good. What it means is, um, we will provide and support the good with public resources whether they're from international donors or from, um, country governments because we simply want to help, um, these people whether it's the rural poor or marginalized groups. And um, many countries recognize this aspect of extension services. Chile, for example, has differential efforts in their

funding of extension services so that services to poor farmers are subsidized more highly. So there's a merit good aspect to extension. Another dimension of extension services from the conceptual point of view is the value that functioning extension services provide, um, a lot of research around this area, more might be needed in specific context, um, but some of it is quite positive about the benefits to extension. There was a research paper by Berhouser, Evanson and Fader, and they examine rates of return to extension services, and uh, found the rate of return between 13 to 80 percent, and they're mostly looking at, um, main staple crops in that study. Then Julian Alston and other authors in an IFPRE review looked at the median rate of return on extension work and found it to be above 60 percent. Again, they were looking at staple crops extension. Um, a study from east Africa by Holloway and Ahooi looked at 168 farm households and they found that 65 of those farm households would be willing to pay for extension services that were equal to the cost of delivering the services. So a real willingness to pay at least on the part of some farmers in that study, and then a study done by some economists from the World Bank, um, in Latin America looked at farmer payments of bonuses that were, um, designed to improve the quality and responsiveness of extension services and they worked with different farmer groups and, um, each of the farmer groups a year after the program, um, said they would be willing to continue the program to pay the bonuses and go forward with it. So um, where farmers receive quality services and responsive services, they're often willing to pay. They may not be willing to pay the entire cost, but they're, uh, willing to contribute to it, and this at least points out the value of these kind of services.

Another part of the conceptual perspective is to consider when you have an ex – an extension program particularly around farmer organization groups or helping introduce a new technology, um, the tail of it, how long that benefit from that extension intervention, um, carries on, and in many cases, there's a very long tail of a successful impact. We know sometimes when we work with farm groups or farmer business associations, they're going to fail. But some of them continue on and they become very powerful instruments to link individual farm households with markets, they can benefit families for a long time in terms of that market access dimension. So we need to appreciate the time scale where some of the interventions we're talking about and the stream of benefits. Right, this is a picture of a woman in Nepal, um, about 40 kilometers outside of Kathmandu bringing her cauliflower to a farmers' market. Um, Rory is on the call, he and I were there visiting at – this was developed – is part of a project in the 1970s

and now many years later, families, some 900 family members, um, are part of this, they still receive benefits from this project. So consider the long tail, the timeframe.

Another dimension of the conceptual framework for thinking about, um, financing sustainable extension services is the political economy perspective. In many countries, there's a shortage of funding for the recurrent costs of especially public sector extension. Um, transport, materials for doing on-farm trials, that type of support is often lacking, or if it's present, it may not get down to the field extension workers for a number of reasons. Another dimension of the political economy of extension is the way that so many extension services including, um public sector extension, um, are organized around projects. So without a – when a project's funding comes to an end, oftentimes the extension services stop but both in the green revolution history and in the, um, US 1930 to 1960 history, that extension involvement was ongoing, sustained in part with significant public support over a long period of time. Didn't just come in and come out, it was sustained. And then a third point on political economy is the derived nature of extension policy. What that means is, um, extension policy, extension programs, especially public sector ones, are in a political environment in developing countries just the same way they are here in the States in that important groups in that political environment include civil servants, um, the small scale farmers, but also large scale and commercial farmers, oftentimes very politically influential. Um, agro industries and political parties, they all have an interest and they shape and, um, influence the delivery of extension services and who gets what in many countries.

Now, when we think about, um, who should pay, who should deliver extension, there are a lot of alternatives out there. That's one reason why we talk about pluralistic extension service, that the reality is that there's often, uh, multiple funders and multiple deliverers of extension services. This is a modification of a chart from Burner and Anderson, um, in their 2007 publication, and I think we have it up on the, um, webinar today, but um, what they wanted to point out was how many different possible combinations and alternatives there are and many of them can be, um, we can observe them happening in the same country at the same time. It – it's not as if one country has a functioning public sector extension system, they can't be in other parts of the matrix. But let's, um, discuss what some of these alternatives might look at – um, look like.

First off, in the top left corner is a public sector financed extension delivered by the public sector. This is, um, like the US system where we have, um, public sector extension and publicly funded extension and in many countries we see this in we see different levels of support, but that's often a key pillar to the extension system. You could also have private sector farmers in the next cell over, um, private sector farmers providing funding and paying public sector, um, extension agents or providers. Um, or private sector companies contracting with public sector agents, or NGOs. This is very common, um, might get their funding from abroad but they would contract or second public sector extension agents. Similarly with farmer based organizations, they could contract with. So we see these, uh, different types of funding and delivery relationships in many countries. You could go down to private sector companies delivering extension services but with funding from the public sector in a contracting type of relationship or similarly private sector farmers paying private sector companies in a fee for service arrangement and so on. Um, there's other arrangements, um, out there, um, one interesting one in some countries is where you have large, farmer based organizations providing services to their own members, um, that would be like the bottom right hand corner of the matrix where you have farmer based organizations hiring agents to provide service to their own members. We've just finished working with Café in Colombia, one of the very large coffee cooperatives where they have quite a successful internal extension program to their farmers' cooperatives and they have, um, 500,000 members they work with and reach with services through their extension program.

Um, now let's talk briefly about some of the best fit approaches that we see out there. First off, in some countries, um, the public sector approach, if it's financed well and delivered, it can be a backbone to an entire system, and one of the points is that in many countries, um, some type of broad, public supported and often delivered approach is one of the only ways to have a national level extension program with the coordination and the ability to reach all different areas. Um, in the public sector, we see a lot of emphasis on decentralization with funds moving to districts and to regions in many different countries with increased autonomy at the local level about spending on extension services and that raises a concern, uh, about whether the local support is there for continuing the funding to go to agricultural services. Decentralization of course was done to improve targeting and local control, um, but it's not a silver bullet to ensure that the funding actually does get to rural farmers. There's politics there as well. We see co-pays and user fees, bonuses and coupons and, um, there's a possibility of using prizes

to strengthen the farmer voice in programming, and um, a need for improved performance reporting, e-tracking we see that in some NGO programs where we can use the extension agent's cell phone information to track their movements and understand where – what villages they're actually reaching, who's getting services. Um, there's – can be more done with IM&E approaches to improve the quality of extension services.

Um, some places we're hearing discussions about performance contracting approaches to decentralization. Um, we probably could learn from the examples in public health, um, and primary education because they're further along in performance contracting and try to take some lessons from those experiences and apply them to agriculture extension. One thing we're seeing in some countries, for example, Ashan Aid in Nigeria doing community and farmer group mobilization to advocate for quality extension services at the local level. Uh, an approach used by some NGOs in the health sector, uh, but there's probably a lot more room for this to be applied in agriculture, to ensure that the services are actually being delivered, um, to the farmers and their groups.

Another dimension is public sector financed but contractor delivered services. We see this commonly in projects where government receives aid, perhaps major funding from a donor like ADB, um, to do extension work but the government will bring in, um, leading international NGOs or local NGOs or private sector contractors to help, um, deliver and implement the program. This is very common. Um, and then, one of the points raised by that is in many countries, the public sector, um, requires strengthened capacity for a contracting role and for the coordinating role, and that's an area that can be improved. Then we see user financed and private provider delivered extension. Some experiments with this underway in eastern and southern Africa, where it's often, uh, um, extension agent that's received, say, six months of training and they become an independent provider getting some financing directly from farmers' groups. This has been piloted by some NGOs and we're looking at the, um, I think the World Bank has some experimentation going on with the government of Kenya along these lines, too, in east Africa. Um, one of the concerns about private farm advisor models are, are the poor farmers and the poorest farmers able to access those services? In some other, um, development programs we realize that even very modest, um, contributions and fees can drive away some of the poorest people, so there can be a tension between the financing and sustainability, um, side of our thinking versus the targeting concerns and the poverty reduction side, and we have to be very careful about that.

Another thing that we're seeing is that in a number of countries, a heightened interest and concern about the registration of extension service providers and certification for providers. This has come up in a number of countries in terms of their policy frameworks around agriculture extension, Kenya, Sierra Leone is currently considering this type of a system, and um, this needs to be watched so that it doesn't become a barrier for, um, farmer to farmer extension, peer extension type of services and other, um, informal extension services. Another set of extension providers and financing mechanisms, um, use marketing margins, um, either in crop sales or sometimes in input sales and where there's a private provider delivering the services, so we see this in export crops, in some countries in out grower schemes, hub and spoke schemes in Ghana and a number of other countries where you have a larger commercial farmer who's providing some extension or advisory support to smaller farmers around his or her farm, um, often providing access to inputs and providing market access for those smaller farmers. Um, it can be combined with inputs and financing. One Acre Fund is one example, but there are others, um, oftentimes in these type of schemes, we don't see the broad set of extension services so they're not services that are going to address the issues of farmer organization. Um, natural resource management at a broad scale or technical advice about other crops and livestock, often very focused, so that's a limitation of these types, but they do have the merit of potentially being standalone or sustainable because of their financing model.

Um, we need to look at these type of services and study more about their impacts on farm productivity. There's a lot of good evidence about them increasing farm productivity. Um, also the income benefits and the poverty targeting of these kind of programs. We see programs that are training input dealers, like the manage program from India where input dealers are getting a sustained set of training experiences and, um, building their capacity to provide good quality advice to farmers. Um, so that's a – another model, and it's important that we realize that within extension, we can do a lot to structure it and organize programs, but that's embedded in an overall enabling environment, so our public policy, our competition policies in the ag sector, and also rural infrastructure play very important roles in determining the economics that affect adoption, and then, um, uptake of the innovations that we're talking about.

So to wrap up, um, there – in nearly all the countries we're working in, there's a role for the public sector extension at scale. Um, it

could be a financing role, it could be a staffing role, a coordinating role, a delivery role, um, we see that, there's real need for improvements in quality in those services, but there is the sustainability, uh, through that system. We need more focus on quality extension services and performance, and we need this system perspective. Um, the coordination that comes out of this system perspective needs greater attention in most countries. Um, we need our information and control systems and reporting systems to match the financial flows better. That's especially in the public sector, um, there's a great need for additional evidence about the value of different types of extension programs, the rates of returns, poverty impacts and production impact, uh, of these programs and many of our projects, um, the M&E frames, um, may not include the type of comparison groups necessary to make definitive statements about, um, value or, um, impacts. They – they might meet our M&E goals, but they may not be strong enough to draw, uh, with learning and how to – from a – from a research perspective. We need more experimentation and applied research, uh, contracting, and things like coupons where farmer groups, uh, might get coupons that let them access and control services directly or co-funding using coupons and prizes. Um, additional research is needed on extension provided through private sector providers like Agro \_\_\_\_\_ or the out growers scheme, hub and spoke relationships and export markets. All those things, um, need better documentation of the poverty reduction impacts and also the productivity improvement impacts. And thinking about financing and sustainable financing, um, raises a couple considerations. Connections, we need to appreciate the extent to how we finance things shapes what we would get out of them, and many of the project structured finances, uh, financial structures are not shaped to be sustainable in their provision of extension support and that's – that's a weakness, although we do get good control accountability with our project based financing. Um, and also financing connects to the management of programs, the control the reporting and budgeting, but also to advocacy and resource mobilization and we need to think about in the different countries we're working in and our own countries, what are the good investments, where are the investments in extension that really will reduce poverty and increase food security, um, increase agricultural productivity and how can we use this finance perspective to improve overall extension system performance in this pluralistic system and bring additional resources into the, uh, ag development equation. With that, um, I'll close. I think we're – have time for some questions and discussion.

*[End of Audio]*