



Capacity Development for National Agricultural Research Systems: Rethinking USAID's Role

Presentation Transcript

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Zachary Baquet:

Good morning everyone. My name is Zachary Baquet. I'm the knowledge management specialist for the Bureau for Food Security, and I'll have to say that this is a first for me. Usually I'm sort of going out into the hall and trying to pull people in and everybody's kind of still wound up, but everybody came in and quietly sat down. I'm kind of – thank you. So, thank you for joining us today. Just some rules for the road. If you have a cell phone, please turn it to silent or vibrate during the presentation. We hold all questions till the end, so please resist the urge to jump up and ask a question during the presentation. We'll have a robust opportunity for Q and A. Just to let you know, today we're talking about capacity development for NARS systems and rethinking USAID's role. We have a couple of announcements. Also, if you're tweeting, please use the #AgEvents hashtag – both online and here in person. You can follow us on Twitter and like us on Facebook. Upcoming events for Agrilinks is Ag Sector Council on July 24th. It's going to be about scaling up ag technologies, so look for that as our July presentation. Also, we're working on an Ask Ag Twitter chat for July as well. That'll probably take place on July 10th, and it is also on the theme of scaling up technologies and how you work on partnerships for innovation. We're working with Feed The Future's Partnership for Innovation activity. So, please look for that on Agrilinks, and we'll probably have an announcement going out as well. Also, we're in the process of trying to collect your feedback, so we've got a survey going on. If you can take five minutes to complete the survey, you'll have a chance to win a \$25.00 gift card. We have Bethel back here, for those of you in person who you can talk to about filling out the survey, or doing a short interview about it. We appreciate your feedback on our seminars, so please, if you're interested or able, please do that. For those of you online, you can contact Bethel via her e-mail address. It's down there on the corner. With that, I'm going to pass the mic over to Rob Bertram, the office director for BFS's agricultural research and policy office, and he's going to introduce our speakers.

Rob Bertram:

Thank you very much, Zachary, and it's a pleasure to be here, and great to see a full house. Before I introduce the speakers, I think I'll just say a few words of introduction. I also want to start by thanking Clara. Where is Clara? There she is. Clara is our science capacity building lead in the Bureau for Food Security. I know she's worked very hard over the last couple of years to help us take a look at the topic we're going to be talking about this morning. In a sense, what we're going to be hearing, I think, is really some of the fruition of what we're learning and thinking about going forward. I wanted to say a little bit about the historical aspects of this. For those of us that have been in this business a while of international development, and particularly ag research, capacity building has been an enormous part of our work in terms of research capacity building, both in the sense of the US universities. USAID had for many years paired US universities with institutions in the developing world that

were very focused on institutional capacity building as well as the human resource capacity building. At the same time, the CGIAR system put together ISNAR – the International Service for National Agricultural Research – and it’s great to have Nienke here who has connections there, and I think Jock, you probably had connections there as well. ISNAR has blended away into a merger with the Food Policy Research Institute – IFPRI – but the stream of effort in this area goes back many years. I think what happened is all too common in our situation when the focus on agriculture and food dropped off in the early 1990s. The bilateral programs in USAID are missions overseas were particularly hard hit, and they were, at the end of the day, the ones that were doing the heavy lifting on institution building, and on human resource development as well. We continued that with our central research investments, to some degree through both ISNAR and through the crisps, which continued to provide a very large amount of human resource capacity building, but not the institutional piece. It’s that that I think we’re going to be looking at today, because when we think about Feed the Future and the renewed emphasis on food and agriculture and nutrition, we are thinking about – we have to think about the sustainability of our investments, and I think we know that without capacity being developed in our partner countries, the likelihood that our investments are going to last over time and perpetuate themselves is going to be reduced or compromised. Then, we also have as a policy objective in the – under Dr. Shaw, what is called USAID Forward. That has many facets, but one of them is the idea that we will increasingly rely on partners in the developing countries where we are working, rather than companies here, or NGOs that are internationally based – not that those don’t have a role to play, but certainly the emphasis has been on building a greater sense of ownership and sustainability on the part of the countries where we work. So, we’re investing at multiple levels, and I think innovation is a heavily used word these days. But, despite that, it is what we’re thinking about at the center. And maybe you’ve seen the slide – I think Clara, you put it together – that has research, extension, education, policy, and entrepreneurship as sort of five areas where we’re focusing our capacity building investments. Capacity building being specifically targeted in some of our investments, but integrated into all of them one way or another. So, in those areas, we have launched a whole series of new Borlaug Fellowship programs of various types to ramp up our opportunities for developing country graduate students to come to the United States, or for graduate students in the US – American or foreign – to internationalize their degrees by working at a CGIAR center – for example, or a NARS in some of their graduate work. We’re also – we have new programs in agricultural training and education led by Virginia Tech. It’s called Innovate. We have our MEAS – the Modernizing Extension, and – Advisory Services – thank you – which is led the University of Illinois. Both of those programs have lots of partners with them. And so we’re putting together what we think is like a platform for

our missions, to be able to access what we think are the best practices. But beyond that, the one that's been missing – and Clara, you've been pointing this out to us, is that we haven't really grappled with the question of the research institutions. And with research being such a large part of the investments we make in Feed the Future, we really couldn't ignore that. We needed to step up to the plate. So – see where I am wandering off here. So, with the – we wanted to make sure that all this investment we're making in, for example, the CGIAR system, the crisps, and private sector, focused on technology development, policy research, policy development, natural resource management practices. We wanted to make sure that that could really be both demand driven, to some degree in terms of the countries we're working with, expressing their needs, their interests. I mean, we talk about being country-led, and so we want that leadership everywhere. But we also – we recognize that in order for them to be full partners in this, a certain capacity and a critical mass is probably necessary. So, we are, once again, thinking about how to engage with strengthening the institutional capacity, as well as the human resource capacity of our partners in research, as well as extension, training, higher education, et cetera. So, with all of this background, we came to Weidemann Associates, and we asked them to – if they couldn't reach out to some of the best and brightest among us who have looked and thought about these issues over the years, we wanted to think about – we didn't want to forget the past. We wanted to learn from the past. But we also wanted to think about what's different. So, I hope we're going to be forward looking, as well as retrospective in our thinking today, because we know that there are changes, institutions. I think probably the biggest ones for us in the information and communication technologies – allowing us to exchange information, allowing collaborators in research to connect much more easily and cheaply, and in real-time with their partners around the world. Probably there are also changes in how institutions are managed, and opportunities for greater decentralization perhaps than was the case in the past. So, hopefully we'll be thinking about efficiencies, as well as effectiveness, as we go through the morning. So, without further ado, our first speaker will be Jock Anderson. Jock comes from Australia where he was an agricultural economist, and from the University of New England in Armidale where he worked for years. But, gosh Jock, we've known each other now 30 years. Jock has been very involved with the World Bank in a number of respects, with the CGIAR system, and I think one of the main thinkers, really, guiding the system in terms of its effectiveness, its operational strategies, and certainly in this area of research capacity. So, delighted to have you here Jock. Jock has been leading, I believe, the study that we're going to be hearing about. And then, it's great to have Nienke Beitema back on this side of the Atlantic. Nienke's been sort of trying to decide for a couple decades if she wants to live in Europe, or North America, or Africa. But we're glad she's back in North America, at least for a while. She's come back to the International Food Policy

Research Institute. Nienke has really spearheaded the Agriculture Science and Technology Initiative – yeah, ASTI – which has been a great source of information that has helped us really understand what kind of capacity exists in the countries that we’re working with in Africa, in particular. So, Nienke, wonderful to have you here with us this morning. Most recently, I guess, coming back from The Hague, where you were also – sorry? Rome. I’m sorry, with FAO. And then, Larry Beach. Larry is a colleague of ours now at AID for more than a dozen years I think. Larry just recently retired from our active office in our research team as our senior biotechnologist, but is staying engaged with us, we’re delighted to say, in a number of key ways. Larry comes out of the private sector research industry with DuPont Pioneer having worked on quality traits in crops, and has helped us enormously in so many ways. One of which though, I think, has been thinking about how to build national capacity in the new technologies to really allow companies to engage in some of the exciting and cutting edge technologies that scientists and farmers want. And then, finally, Bill Bradley, our foreign service officer has just flown in from Cambodia. Bill, thank you very much. He just got in last night. Bill is somebody on the frontlines thinking about this in the context of a USAID mission, so that’s an incredibly important perspective for us, because as I said at the outset, it’s really the missions. I mean, we can try to be catalytic and try to make sure that the best information, and the facilitated access to that is available. But at the end of the day, it’s commitment on the part of the missions; and by extension, the host country because, again, as a country-led operation, we want to be reflecting their objectives as well. So, welcome Bill. So, Zachary, shall I turn this back over to you? Oh, right to Jock. Okay, Jock. Thank you very much.

Jock Anderson:

Good morning, and thanks very much for joining us this morning. I’m looking forward to our eventual discussion. Unfortunately, the rules means we can’t really dialog for a while. Thanks for the introduction, Rob. It’s been a real privilege for me to work with Weidemann to try to advance thinking about this topic. My job this morning is to basically speak to something which we call the issues paper, which I guess you’ve all had the opportunity to download on the Agrilinks site. What to know – it’s there. I’ll be speaking about various aspects of that. in my allotted time, which is rapidly frittering away, I think I can’t really do much justice to it, but I’ll try. I think I don’t need to tell anyone in this room or the people online, which we have – Zachary didn’t mention, but we have some 25 people around the world tuned into this – how many? 69 now, wow. And, I’m actually daunted by all this technology that we’re confronting today. So, I think we all understand what the general objectives of Feed the Future, and Rob has kindly pointed out that supporting research endeavor in the developing countries is a really important part of the Feed the Future program. We’ve tried to – issues paper – we tried to identify just what is – what we’ve learned from the

past engagement, and unfortunately the real engagement was a few decades back now, so we're having to go back in time to see what we think we learned from that experience, and try to figure out what makes good sense to do now. I want to acknowledge the fact that I worked closely on this project with a chap called Han Roseboom who used to be – is now a staff member, when it was in The Hague way back; he's now an independent consultant, and he's currently – today, he's in the Dutch part of Latin America on another mission. So, he's unable to join us today, but I'll try to represent him in what we do. So, just a brief overview of what we did. First of all, we tried to review literature, which is quite vast, really. And we drafted an issues paper draft, which was intended to be the basis for what became the roundtable meeting organized by Weidemann. Our colleagues in the Bureau of Food Security kindly canvassed USAID staff in the missions, and we got 21 really fruitful responses from that exercise. We did our own survey of around about half a hundred stakeholders in various agencies around the world to try to – these were people who we knew couldn't be at the roundtable meeting. We then had the roundtable itself on March the 5th, on which we had some 30-odd people who turned up, who ostensibly read the issues paper and had their own thoughts about this topic. And, we agonized over that for a whole day, and then Han and I revised the issues paper, completed the literature review, and that's what you have as your reading material that I'm speaking to you today. We have shied away from being very strongly didactic about USAID should do. We think this is something that AID itself has to still figure out, and I'm heartened to see that management of AID is trying to move forward actively on this. Although, as Rob said, it really lies in the hands of the missions in particular countries to do the _____. Well, I'm not going to talk too much about the Agricultural Innovation Systems perspective today. But I just want to note that when we used to think of national ag research systems a few decades back, life was pretty simple. We just focused on _____ system, and tried to make it work, and USAID was very helpful in building up many national research systems to do that. But, in more recent times, thinking has moved on through various fads and fashions. We went through the Agricultural Knowledge and Information Systems – AKIS – way of thinking about the world, which was really reaching out to include both education and extension, as well as research in a more integrated way. And most of the contemporary thinking is really now done under the umbrella of Agricultural Innovation Systems, which is sort of a freshened up view of AKIS, but paying particular attention to other parties, such as the private sector, non-government organizations, and to take a wider view of all the elements that make an innovation system work or not. So, many factors that influence the effectiveness of an innovation system: political and economic stability is an important one. Having an innovation policy itself is a pretty good idea, and to address the various governance issues that are required. Education as an import to the whole system is critical, and this

goes not just for the scientific stuff, but also down to extension workers and farmers. The regulatory arrangements are critical. Intellectual property rights management is typically an unattended theme in many parts of the developing world, so it's really hard for the private sector to really engage unless there's adequate protection of intellectual property. Buyer safety has been picked up pretty aggressively in many parts of the world now, as is working on meeting SPS standards and other food safety standards. Really critical thing is the broader investment climate surrounding the agricultural sector, and unless infrastructure elements and rule finance are adequate, it's very hard for the research part of an innovation system to function without all the connecting bits and pieces. So, it's a messy business that we're talking about. It's very hard to generalize about national research systems because they're so diverse. A few systems have very large numbers of staff. I mentioned here China and India having more than 10,000 each. But many countries – the scientific staff really just in scores hardly even 100 in many small countries. But, even small countries have typically diverse agricultural sectors, so it's quite challenging for a small, poor country to address the range of research leads that could be, in principle, be addressed through a national research system. There's many other ways of categorizing NARS. You can think about the lead agency types. Some of them work in divisions of ministries of agriculture, or sometimes science and technology – that's common amongst the smaller countries. In the large __ countries, there's typically a semi-autonomous national agricultural research organization. One can think of Embrapa in Brazil as a good example of that. The Asian model tends to focus on agricultural research councils leading a variety of more or less independent research agencies. And in very few countries, a university takes the lead within the national system. So, there's lots of different ways of thinking about an organizational setup in a national system. Whichever one we think about in a particular country, the overriding worry is that governance issues compromise the performance of whatever system is in place. Typically, the issues in governance relate to a lack of client orientation in the research program management, poor incentives for staff to do sort of the right research that's required – seat down here, please – and there's typically – at least in the public parts, which is the dominant parts of most national research systems – there's nearly inevitably weaknesses in the way that recruitment is made, and promotion is handled. I'll lapse into some Pakistani speak soon 'cause I've been recently working on the contemporary reforms of the Pakistan national research system, which USAID is playing a really big part in building up a system which is in sad decay at the moment. Some of the issues that we've hit there. Well, between the '60s and '90s, it was very common to bring the fragmented pieces of a research system together. However, more recently – well, let me just say that in today's thinking, there's a lot of anguish about – we've now got big consolidated national systems, but within them, there's a lot of dissents and lack of harmony.

So, some of the recent techniques that have been used to try to foster more effectiveness: greater use of competitive funding schemes, deconcentration of ag research capacity through the national system, and many efforts – still rather frustratingly weak in many cases – to get greater stakeholder participation, particularly to get farmers and farmer organizations embodied actively engaged in setting research priorities and actually conducting relevant research. So, let me – I think I’ll have to rush over this, but I’ll just note that we’re not dealing with static systems. Not only are they diverse around the world, but they’re in various stages of change, which means that when USAID thinks about how to do useful things to make national systems better, it really has to get into the nitty-gritty of just what’s been happening, which means careful assessment at the local level, which again means that we’re going to be relying on USAID’s staff in their missions to try to ferret out where things are at in any particular system. Well, I wanted to emphasize that national systems work within a global context so that we also have to think about how we can link up national efforts with relevant regional and international efforts, because we recognize through much study that many of the benefits ultimately realized, actually, come from spillions from outside. Rob mentioned the CGIAR as one source of that sort of spillion. But spillions are not universally easy to achieve, and I mentioned here in passing that some of the work that Phil _____ and colleagues did for the World Development Report 2008 showed how difficult it was for rich country research findings to find their way as spillions to many of the African challenges, for example. So, in the slide’s notes, you’ll find a reference to that work. I think I’ll defer discussion of the overall investment situation in national systems to Nienke, although she has also too little time to really explain the rich set of information that ASTI has accumulated. I must say I’m delighted to learn that, along with Nienke’s return to Washington, the ASTI initiative is going to shift its emphasis away from just documenting human resources and financial flows in national systems, to get into more analytical work about what – how efficient and effective our national agricultural research systems around the world. This is a new thrust of the IFPRI program which probably – Nienke – probably hasn’t got much time to talk about today. I think I’ll have to skip some of this in the interests of keeping us on track. Well, I just wanted to make a point that the standard argument for investing in ag research is the fact that it seems like a really good thing in economic terms, and the many studies have found that the internal rate of returns on ag research investment at the national level are typically the order of 40 percent internal rate of return. Now, the questions can be asked about those studies: how representative they are, how reliable the information is, but it seems like it really is generally a pretty good thing, even if maybe not always as good as 40 percent sounds. But national decision makers, policymakers in the developing world have seemingly been unpersuaded by that since they’ve been so cautious about making their own investment plans to increase the

intensity of research investment, and so that the situation varies around the world. But, typically, most developing countries are still spending far too little on research relative to the size of the agricultural sector. My Zachary is very kindly managing our time in a way that means I have to go a little faster here. I'm sorry. In thinking about the capacity dimensions of what USAID might support, human resources are clearly important. But, there's no way we can go back to the vast study programs – bringing developing country students into the US academia for particularly doctoral studies – I think what we have to do these days is think more about fostering local capacity for better training to staff in a relevant way with appropriate skills and nationals, and cultural research systems. In many cases, the universities are not really up to the task of doing that, either by the fact that their staff skill is too low, or they're underresourced, overteaching – I think most of us have seen examples of this in the developing world. So, there's a lot of opportunity for USAID and other donors to better support the university elements of a national innovation system to make it more effective. How many minutes have I got now, Zachary? Okay. So, let me – I know you're all great speed readers, so – are remote colleagues seeing this as well, Zachary? Okay. Thanks. Well, my apologies for going to quickly over my excessive number of slides. Let me try to zoom here a little more. We analyze the organizational management issues in the issues paper, which I would _____ have a look at. And if you're a bit pressed for time, there's a short version which is called a technical note, which tries to summarize the big story in less space, so I'd recommend that to you as a short read. On policy issues, this is typically one of the weakest parts of a national system is the national capacity for policy analysis and policymaking concerning the research and innovation system. I think this is one thing that USAID could really help in providing technical assistance. As Rob mentioned, the earlier effort of having ISNAR as a national center designed to do that, sort of didn't achieve all its ambitious very brilliantly, although I think it did a lot of good things. And Derek might want to talk about – since he played a role in closing ISNAR down, he might want to mention something about this later. But the archived ISNAR documents are still a very rich source of information on really insightful advice about how to make national systems work better and more effectively. In contemporary dialog terms, we have – the Global Forum on Ag Research – GFAR has now got what they call a roadmap which has been updated a couple of times since it was launched in 2010. Our materials in the issues paper lay out the details of all this, but you can also go to the GFAR website and get up to date information. So, again, I think my time doesn't permit me to go through all this, so let me jump to my conclusions. I want to reemphasize that since things vary so much around the developing world, we have to assess how things are in any particular situation. That's not an easy or costless thing to do. I've found this in my recent work in Pakistan that it actually takes a lot of effort to do a really good analysis of what's not working and

why it's not working in a national system. So, we hope that USAID mission staff can pick up some of these materials we've assembled to try to help them zero in on how they might best understand what would be really good to support to make the national systems more effective. The existing materials prepared by both FAO and ISNAR I think are still relevant, even though they're looking a bit dated these days, and maybe Weidemann and others can, in the future, jazz these up a little, and maybe our little efforts can help. So, let me desist for the moment, and I look forward to having a chance to dialog with you after the other presenters have made their spiel. Shall I hand this to Nienke? Thank you.

Nienke Beitema:

Is it on? Yeah. Okay. I have a few minutes to give you a brief summary of some of our latest global trends in agricultural research was published last year for the GCART meeting – the second one that came after, and the one that where the roadmap was presented. I had a couple of copies outside. They're also available on the ASTI website. I will end with a few words on how I also see where ASTI can collaborate or partner with USAID missions on some of the issues being raised in the issues paper and the technical note. So, there was – the global update actually reveals that the trends that were happening before the turn of the millennium in the '90s where we saw a slowing growth in public agricultural R and D spending that this has been revised. Since 2000, agricultural R and D globally increased by more than one fifth. But most of this growth actually happened by China and India. Of course, United States is a big country as well, but also our data revealed that some of the other middle income countries – the larger, more advanced middle income countries like Argentina, Iran, Nigeria, Russia, for example, also contributed to this public agricultural spending growth. The second result is that – not surprisingly, but that spending by the private sector also increased. This is data that has been – research has been done by USDA – ERS and USDA. A large part of this growth happened in the food processing area. So now that agriculture as such, but then food processing research. We also – the CGIAR was mentioned a few times. Funding to the CGIARs – the system itself has also – there was in the 90s a period which is very – which is very clear. In the '90s, also a period of stagnating growth. And since – especially 2005, there is a spur in funding for the agricultural – what is CGIAR system. Actually, when we look at the public spending as well – I've just presented the growth from 2000 till 2008. We see that a large part of this growth happened since 2005. And of course, it's going to be interesting what happened after 2008. We don't have that information ready yet, but we hope to have an update by late next year. However, our data also shows that public agricultural R and D for investments in low income countries – many of the low income countries have been stagnating, and have been highly volatile. You can see here: for low income countries, the volatility ratio – I will not explain the details of course, 'cause I only have eight minutes, is twice as high as, in income

countries, and middle income countries. And if you check here, Africa, south of the Sahara – same story. The volatility in agriculture R and D spending in Africa is much higher than in other countries – lower middle income countries. This is partly the result of the high donor dependency in Africa, which is causing this volatility. But also if we only look at government funding in agricultural research, we see a high volatility in this region. We've published – I was hoping to be here and tell you: this is new data for Africa. But you have to wait a few months.. We're in the process of finalizing a new evidence on human resources – financial free sources institutional developments in 40 Sub-Saharan African Countries. We also know working in North Africa as well. So, in our previous study, in addition to this high volatility, we've found that there is still online investment in agricultural R and D. I don't have a slide on this because I expected Jock had to – and I saw that you had it on one of your slides. The intensity – the agricultural R and D investment as a share of actual _____ remains very low in most of the developing countries, including Africa. We've seen an increase in spending in agricultural R and D in Africa, and when I looked quickly at the _____ that we are – I think we have about 20 – 25 countries ready or about ready. We're still tweaking a little bit with the data. But we see that _____ investment actually in Africa has continued and probably increased 2000. We now have data till 2011. The same is true for the number of researchers. We see an increase in the number of researchers in most African countries. There are a few where this is not the case. There's growth in investment capacity, like in _____ Africa has always been the region where there was a lot of high volatility stagnating growing. We see this is increasing, and we need to see how much of this is also driven by these large World Bank funded projects – the agricultural productivity projects, because we think that a lot of the growth is driven by this – by that funding. We have – these are the challenges that came out of a previous study. Because of the whole – especially this one, and also – yeah, this _____, we've now collected data on agricultural researchers, also by gender, so we get a better sense of how serious this aging is. So, it's age by degree, and age by gender. So how serious this aging of research staff is happening. We're also working in six countries – West African which is funding by _____, the _____ organization on doing more in-depth investigations of institutional, human, and financial capacity, looking at some of the issues that are raised in the technical notes that Jock was referring to. This technical note is also – makes a recommendation to do more in-depth NARS assessment by the missions, or together with the missions. I think with some of this information that comes out of the ASTI program, I think this will provide a nice platform of partnering with US _____ more closely and working together, making the ASTI data, but also doing more of this in-depth information that we are piloting in these six African countries. Thank you.

Larry Beach:

Good morning. I would like to give my perspective based on some very sort of narrow perspective – working in specific projects with NARS partners on mostly bioengineered crops, and the research around developing a product using that tool. But also, some of the advanced tools for breeding. My experiences, as you might guess based on some of what's already been said, quite variable. There's no one size fits all way of describing what happens and how things work. But I think I would argue that for interactions and my experience that it comes down to some very simple things in some respects, but obviously not easy. It's about leadership and about having sustained funding over time. The volatility issue is a big issue when it comes to being able to do research, and it's not possible to really plan very much about research, and do good research if you don't have stable funding. So, and some examples – some of the slides you're seeing here are about cassava in Uganda. The research programs there have been with NARO, and partners around the world. So, we tend to work with partners around the world that have advanced technologies that they can partner with the scientists in the labs in the national agricultural research organizations in both _____ in Uganda, as well as in Kwando for Banana. These scientists have advanced degrees, are very well-trained, and as a part of the programs, they've had additional scientists trained. One of the issues that is a constant is the institutional capacity for them to do what they need to do. There is frequently not reliable electricity, not reliable telephone communication or internet. So, it's been very difficult for some of these folks to even communicate with their partners around the world. The leadership of these institutions has recognized this and is trying to make improvements, and that's one of the key things is that the leadership sees these things and enables the scientist to do what they need to do – basically to remove roadblocks, to get what they need to get done. But the partnerships with the international scientists in other locations is key because it helps them understand how this is done in a very rapid way, and they get direct feedback, direct interaction. The scientists all visit each other. That helps in a big way to get things done. In the case of cassava, what it has resulted in is actually getting an increase productivity through transgenic virus resistance that has created a brown streak resistant cassava that the breeders don't have through their natural breeding material. In banana, it's resulted in a transgenic banana that has banana bacterial _____ that isn't available through their normal breeding material. But it was the sustained support of the banana folks over time that enabled the capacity of the people in cassava to get started. So, in-country support was enabled because of a very long-term support that the mission in Uganda had for the banana effort. So, again, I think the sustained effort of support is important. My last example is in cowpea in Nigeria and Burkina Faso. There, there's excellent results in terms of improvements of Maruca resistance. It's a pod borer that's shown here that – 50 percent yield loss on average, and it's not very easy to get sprays, or afford sprays, but there is a transgenic

approach using a BT protein which actually results in tenfold increase in yield in one experiment. But overall, definitely results in resistance to this cowpea pod borer. The main important aspect of this is, again, partnership with advanced labs, and being able to complete – have enough funding for research to improve the facilities, and to have capability to do the research over time. What’s – again, very important is the interaction of scientists between countries that helped each other learn techniques that enabled one country to do something that they weren’t otherwise able to do. And in fact, it was an important partnership between countries that they learned using methods that were more appropriate for these in-country efforts, especially in terms of some entomology. The leaderships are critical, again, and quite variable, honestly. So, we find some leadership – make sure that roadblocks are removed in one country, and not so much in another. What is absolutely essential in this case is the ability of an oversight team to actually help guide the effort in an advanced research effort like this and the Africa Agricultural Technology Foundation has been an important player for this. And I think that – one thing to realize is that in many cases, these scientists actually have no money coming from their country. There is zero money for these folks working on cowpea in Burkina Faso for any research. They get paid their salary – that’s all. If there was not funding coming through this kind of effort, they would not be able to do any of their research. That’s something that I don’t think many people appreciate, that they’re – the country support is quite low in some cases. I think I’ll stop there.

Bill Bradley:

Thank you for listening to me for a few minutes. I’m going to keep it short, but I’m give you a perspective from USAID Cambodia. In general, and I just want to paint a picture here, and the transition you just made between that there’s very limited resource for research is a good one into what’s the situation is in Cambodia. But before I get to that, I want to talk about the demographics. The demographics are – Cambodia is coming off of a very difficult period of time in its history, and you have an older generation that is aging and is still very much in control, but there is – the other part of that is for the past 20 years, have been a young generation emerging who are active, who want to learn, want to learn about the world, and this is a country where 15 – 20 years ago was – it was not legal to speak English there. One of the most popular courses for higher education is English, because they see – the young generation sees English as a way to communicate with the outside world, and learn new things, and so I wanted to just sort of paint a picture of that. That’s what’s emerging in Cambodia today. Vibrant youth that want to learn. It’s also a country with many challenges, from obviously vulnerability to climate change – the Mekong River – the _____ Ecosystem is very vulnerable to climate variability, and there’s a lot of technical challenges that people go through, and farmers work with to adapt with changing climate situations. And also, laid on top of that, the water resource – the

dam programs, the water resource issues that are facing the country. And in order for them to advance, and make them – for the country to be able to become – their goal, their stated goal to be a middle-income country. Then, of course, with that other context, there is, as you can imagine, a lot of urbanization. Young people want to come out of the rural areas and move into the city for a better life, and so that’s another piece that’s there that we experience. And so, within that context, we – what we have with the mission in agricultural development is a program that reaches out to farmers to help them use proven technologies to increase their yields and income and their food security. We do that – there’s about 30 or 40 farmers per village that we work in, and we have a very intensive program in horticulture, aquaculture, and rice to help them – to help farmers increase their incomes. There’s – as you know, with all the Feed the Future, as you know, there’s a very big emphasis on getting results, and we get results with that. The farmers respond, we achieve results, and we do the farmers – the farmers make more money. Now, the challenge is: how do we take that, and – well, let me go back. In addition to that, we have the requirement to evaluate that – evaluate the impact of that. So by doing that, we work with the university and local research institutions to evaluate the impact of that, but to do that in a way that builds local capacity for Cambodians to evaluate that. That’s what I want to focus on, is – and through an example, actually. We have a case study that is currently going on to evaluate the effectiveness of extension in Cambodia. We’re doing that with Rural University of Agriculture. There are 81 students coming from 62 different communes – rural communes out from all over Cambodia that have chosen to go to RUA and that are involved in the data collection for this case study. That’s an example of rural students coming to work with the – associated with the food security three program with Michigan State University with a principal investigator from the university. But then with 81 students that go out all over the country and collect data. So what is that? That’s helping these students get the – helping these students get the exposure, and giving them an opportunity to get out and work, and this is the kind of thing – how we’re trying to link these larger projects – well, these projects that are focused on getting tangible results for farmers’ income, nutrition, and food security with a sustainable – the requirement to create a sustainable system by involving the Rural University of Agriculture. There’s a lot I can talk about, and I can devolve into all sorts of detail, but I’ll try not to. So, the reason we chose to work with the university and focus on creating a link between extension and teaching and research is – and we have the – is because that’s the sustainable way that we can secure these results that we’re making with our flagship Feed the Future program. That’s a temporary thing. But over time, the knowledge and the capacity if we do it in a way that builds local extension research and teaching capacity in the local institutions is the path for sustainable agricultural development. That’s why we do it that way. That’s a quick overview, but it helps you

understand the kind of challenges, and then there's all sorts of details that we work with on a daily basis to actually implement that. But the youth are going to populate business, they're going to populate the government of Cambodia, and they're going to populate the projects – a percentage of them that decide to go into the agricultural field. Okay.